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# Current Practices in Environmental Auditing

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This report provides a discussion of environmental auditing followed by detailed descriptions of five individual audit programs. It has been developed to help further the understanding of environmental auditing and how various companies approach the subject. The descriptions of the environmental auditing programs of five companies presented in this report are based on in-depth interviews with the companies audit program managers. Examples of the various programs documents --- checklists, protocols, audit reports, etc. --- obtained from each company are included in the company profiles to help the reader further understand the nature and scope of each program and some of the key alternatives available in designing an audit program.

The companies profiled in this report represent a diversity of auditing approaches, as well as a variety of industry segments. All have management support for their programs and have made significant commitments to their environmental auditing efforts. Each company willingly agreed to discuss its audit program in detail and provide examples of its program approach and supporting materials.

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# Current Practices in Environmental Auditing

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# PREFACE

This report provides a discussion of environmental auditing followed by detailed descriptions of five individual audit programs. It has been developed to help further the understanding of environmental auditing and how various companies approach the subject. The descriptions of the environmental auditing programs of the five companies in this report are based on in-depth interviews with the companies' audit program managers. Examples of the various program documents--checklists, protocols, audit reports, etc.--obtained from each company are included in the company profiles to help the reader further understand the nature and scope of each program described and some of the key alternatives available in designing an audit program.

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# NOTICE

This report has been prepared under contract no. 68-01-6160 for the Regulatory Reform Staff, Office of Policy, Planning and Evaluation, U.S. Environmental Protection Agency. The programs described in this report were selected to provide instructive examples of five companies' environmental auditing activities. The report reflects the findings and conclusions of the author and not necessarily those of EPA or any other government entity; and mention of any company names, products or processes does not constitute EPA endorsement.

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# I. OVERVIEW OF ENVIRONMENTAL AUDITING

## WHAT IS ENVIRONMENTAL AUDITING?

The word "audit" has become associated with a wide variety of efforts, activities, and programs intended to examine the performance of an operation and determine or verify its accuracy and appropriateness. Auditing, in its most common sense, is a methodical examination, involving analyses, tests, and confirmations of local procedures and practices leading to a verification of compliance with legal requirements, internal policies, and/or accepted practices. Many corporations have established programs to monitor and "audit" the performance of environmental activities and have come to see environmental auditing as a powerful management tool to help determine the compliance status and environmental performance of operating facilities.

Companies use various names to describe these programs. "Audit" is the most common, although review, surveillance, survey, appraisal, and assessment are also used. Some companies have deliberately chosen not to use the word audit, sometimes at the request of legal or financial staff. Others use audit precisely to lend credibility to their programs. Of the five companies in this study, only three use the term audit to describe their program. The remaining two use the terms assessment and surveillance for their overall program; however, one of these companies refers to their facility reviews as "audits" and the individuals who conduct them as "auditors."

## WHY AUDIT?

Motivations for developing an environmental auditing program range from the desire to measure compliance with specific regulations, standards, or policies to the goal of identifying potentially hazardous conditions for which standards may not exist. Thus, while auditing may appear to serve the universal need of evaluating and verifying environmental compliance, in practice auditing programs are designed to meet a broad range of objectives, depending on the corporate culture, management philosophy, and size.

Companies have established environmental auditing programs to:

- Determine and document compliance status.
- Help improve overall environmental performance at the operating facilities.

- Assist facility management.
- Increase the overall level of environmental awareness.
- Accelerate the overall development of environmental management control systems.
- Improve the environmental risk management system.
- Protect the corporation from potential liabilities.
- Develop a basis for optimizing environmental resources.

Though these objectives all address compliance, they can produce differences in program scope and focus. For example, some programs focus on determining present and past compliance over a specified time; others focus on determining compliance only at the time of the audit; still others focus on helping the plant manager achieve or maintain compliance. There is a trend to move beyond auditing compliance status to auditing the environmental management control system (the system of controls and mechanisms that are in place to ensure compliance). This trend is likely to increase in coming years, since it provides the tools and information needed to assess environmental compliance. It can extend the value of the audit by confirming that appropriate systems are in place and functioning to manage compliance rather than merely determining the compliance status at the time of the audit.

There is considerable diversity in the extent to which the goals and objectives of audit programs are documented. Some programs (including three of the five in this study) have a written corporate statement describing the audit program. Some (including two of the five programs) have written position descriptions for the audit program manager and audit staff.

## PROGRAM ORGANIZATION AND STAFFING

In deciding where to house the audit program within their organization, some companies emphasize independence for the audit function while others emphasize accessibility to and familiarity with the information to be audited. Typically companies establish audit programs within a core corporate group. This core group is most commonly found within the corporate environmental function, but in some companies is located in the internal audit department, regulatory affairs department, production or operations department, or legal department.

Companies choosing to house their environmental audit program in the internal audit department tend to view the program more as a corporate than as an environmental management tool. Production or operations departments are sometimes chosen to reflect or reinforce a company's philosophy that operations is responsible for environmental management. The legal department may be chosen because of sensitivity to potential legal issues involved in environmental auditing (e.g., potential disclosure of sensitive audit information).

Wherever the audit program is housed, the legal department usually is involved in the initial development of an environmental audit program and plays a central role in developing the audit reporting process. As the audit program becomes more established, the legal department's role in the audit program often is limited to providing advice on regulatory interpretations and to review the audit reports. However, the legal department usually is more actively involved when an audit uncovers a significant noncompliance situation. None of the companies in this study houses its audit program in the legal department, although one company's program (as well as its environmental management department) organizationally reports to the General Counsel.

Typically, an audit program is funded in a manner consistent with the environmental and other corporate staff functions. In most companies, costs are absorbed as overhead and included in the budget of the organizational unit responsible for the program. However, in a few companies, audit costs are charged back directly to the audited facilities (usually where a company directly charges back the costs of many corporate staff activities). It is not unusual to charge travel and out-of-pocket expenses to an individual's assigned organizational unit when a company uses staff for the audit on a part-time or special-assignment basis.

Companies staff their environmental audit programs in a variety of ways. Most environmental audit teams include individuals with technical expertise, knowledge of environmental regulations, and plant experience. Several companies also include auditing expertise, knowledge of environmental management systems, and understanding of similar companies' hazard control programs as staffing criteria. Audit teams usually include environmental specialists and may also include a plant manager, process engineer, attorney, analytical chemist, internal auditor, toxicologist, or outside consultant.

Some companies have a full-time audit program manager; others staff their audit program only on a part-time basis. Of the companies that staff their program on a part-time basis, some do not conduct enough audits to justify full-time staff while others want to vary participation in their program by rotating the audit team membership. Some rotate the membership of the audit team to involve a wider range of staff; other companies vary their team membership to get the specific expertise desired for a particular audit. Of the five companies featured in this study, two staff their audits entirely with full-time auditors; two rotate the audit team assignments among environmental professionals; and one uses a combination of full-time auditors and rotating team members.

Using the same auditors for every audit (as opposed to rotating the membership of the audit team) provides greater continuity from audit to audit, and generally greater confidence that the goals and objectives of the program are being met.

## AUDIT SCOPE AND FOCUS

Companies define the scope and focus of an audit in organizational, geographical, locational, functional, and compliance contexts. Organizational boundaries address which of the corporation's operations are included in the audit program. They generally depend on the organization structure, business unit reporting relationships, and corporate culture. Geographical boundaries address how far or widely the program applies (state or regional, national or international). Selection of geographical boundaries generally depends upon the location of facilities and offices, and the nature of products and services.

Locational boundaries address what territory is included in a specific audit. In many cases, the audit focus is on the activities within the plant boundary. However, some companies audit beyond plant boundaries. For example, an audit could also include a nearby river or lake if there is a potential for environmental damage, off-site manufacturing or packaging activities, off-site waste disposal activities, or local residences. Additionally, many companies include the activities of a tenant producer located on plant property in the scope of their audit. One of the companies featured in this report has developed specific audit procedures for reviewing its facilities' contractor programs for hazardous waste disposal. The auditors review the records available at the manufacturing facility, and examine the contractor's training, safety/security, storage, handling, treatment, and environmental monitoring activities. Another company, whose operating divisions are responsible for managing off-site disposal, audits each division to ensure that these activities are handled in a manner consistent with corporate policy. Yet another company's audit team occasionally follows a waste hauler to a disposal site to confirm that waste is going to the appropriate location and to observe any problems enroute.

A number of specific functions or subject areas can be included in an environmental audit program. While many audit programs cover air and water pollution control as well as solid waste management, several also include one or more other areas such as occupational health, occupational safety, and product safety. If all environmental, health, and safety disciplines are housed in the same organizational unit, the scope of the audit program is more likely to include these other subject areas.

Finally, compliance boundaries define the standards against which the facility is measured. These standards can include federal, state, and local laws and regulations; corporate policies, procedures and guidelines; division or operating company policies, procedures and guidelines; local facility operating procedures; or standards established by an outside group such as an industry association.

## AUDIT APPROACH

A number of basic activities are common among most audit programs. Some activities are undertaken before the on-site audit, some during the audit field work, and others after the field audit has been completed. Virtually all environmental audits involve gathering information, analyzing facts, making judgments about the status of the facility, and reporting the results to some level of management. A team approach is commonly used to conduct these activities. Even with these basic similarities, there are a number of important differences as illustrated in this study.

Figure 1 presents a simplified model of a basic audit program. Most companies, including each of those profiled in this study, make some provision for including each of the following steps in their audit process.

### Audit Planning

The environmental audit process usually begins with a number of activities before the actual on-site audit takes place. Some companies audit all facilities on a repeat cycle (e.g., annually or every two years). In companies not auditing all facilities on a specific repeat cycle, the facilities that will be audited must be selected and scheduled. A list may be drawn up annually and modified throughout the year. Companies select facilities for audit by a number of methods, including random selection, perceived hazards, and business importance.

Initial arrangements relating to a facility audit include scheduling the visit, selecting the audit team, and gathering and reviewing background information. Initial notice of an upcoming audit (audit lead time) varies from company to company and may be anywhere from one to six months. However, one company featured in this study gives advance notice of only a few days in order to achieve the advantage of surprise and obtain what it believes to be a more accurate picture of facility operations.

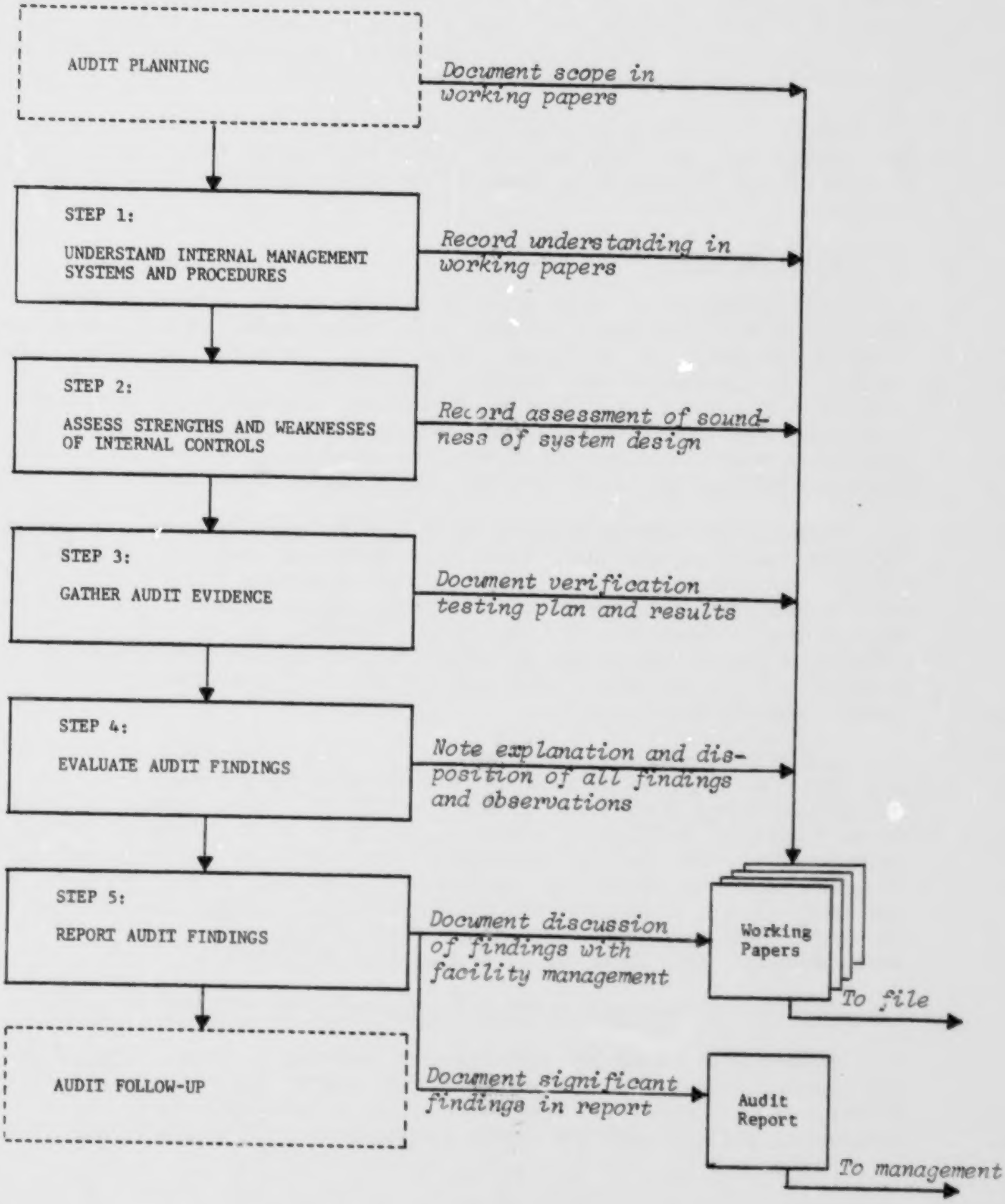
Information gathering generally begins well in advance of the audit and includes regulatory requirements, corporate policies and facility information (organization, processes and layout). Some companies' audit teams visit the facility in advance of the audit to develop a basic understanding of facility processes and environmental management systems, and to brief the facility staff on the objectives of the upcoming audit. Collection and review of advance information results in an audit plan outlining the needed audit steps, how each is to be accomplished, who will do them, and in what sequence.

### Step 1: Understand Internal Management Systems and Procedures

Most audits begin by developing a working understanding of how the facility manages activities that may affect environmental performance. This usually includes developing an understanding of facility processes, internal controls (both management and engineering), plant

Figure 1

BASIC STEPS IN THE TYPICAL AUDIT PROCESS


AUDIT PLANNING
Document scope in working papers
STEP 1:
UNDERSTAND INTERNAL MANAGEMENT SYSTEMS AND PROCEDURES
Record understanding in working papers
STEP 2:
ASSESS STRENGTHS AND WEAKNESSES OF INTERNAL CONTROLS
Record assessment of soundness of system design
STEP 3:
GATHER AUDIT EVIDENCE
Document verification testing plan and results
STEP 4:
EVALUATE AUDIT FINDINGS
Note explanation and disposition of all findings and observations
STEP 5:
REPORT AUDIT FINDINGS
Document discussion of findings with facility management
Working Papers
To file
AUDIT FOLLOW-UP
Document significant findings in report
Audit Report
To management

organization and responsibilities, compliance parameters and other applicable requirements, and any current or past problems. This step allows the team members to understand the actions intended to be taken within the organization to assist in regulating and directing its activities.

In developing this picture of internal management systems, auditors usually draw on information from multiple sources. These may include selected information provided by the facility in advance of the audit, a specially designed internal control questionnaire, staff discussions, and plant tours. Using questionnaires, discussions, and/or tours as background, auditors further investigate the more detailed aspects of key control practices and procedures through in-depth interviews, guided discussions, and additional tours to specific sites. The data-gathering methods most used in Step 1 are inquiry and observation.

### Step 2: Assess Strengths and Weaknesses of Internal Controls

After clearly understanding how various aspects of environmental compliance and performance are intended to be managed, auditors then evaluate the soundness of the facility's management systems and procedures to determine whether they are functioning and will achieve the desired performance.

In assessing the strengths and weaknesses of internal controls, auditors typically look for such indicators as clearly defined responsibilities, an adequate system of authorizations, capable personnel, documentation, and internal verification. It is far easier to identify significant weaknesses in internal controls than to determine adequacy. Each of these indicators usually requires significant judgment on the part of the auditor since there are no widely accepted standards an auditor can use as a guide to what is acceptable internal control. Thus, many auditors look to the audit program objectives, as well as to the corporation's basic environmental philosophy, for guidance about what is satisfactory internal control.

### Step 3: Gather Audit Evidence

Audit evidence forms the basis on which the team determines compliance with laws, regulations, corporate policies, and/or other standards. Evidence is gathered in a variety of ways, including records reviews, examination of available data, and interviews with facility personnel. Relatively few companies actually sample and analyze emissions or effluent as a regular part of their audits. Many companies outline or describe their audit procedures in some type of protocol, questionnaire, or checklist to guide the auditor in collecting audit evidence.

Suspected weaknesses in the management system are confirmed in this step. Also, management systems that appear sound are tested to verify that they work as planned and are consistently effective.

Audit procedures (the means by which auditors collect audit evidence) fall into three broad categories:

- Inquiry--the auditor asks questions both formally and informally. Audit questionnaires are common examples of formal inquiry.

- Observation--the auditor collects evidence through what can be seen, heard, or touched. Because physical examination is often one of the most reliable sources of audit evidence, observation is a significant aspect of most environmental audits.

- Verification Testing--the auditor focuses on either the management system or pollution control equipment and performs systems tests. For example, retracing data would uncover errors in recording original data. Other common types of testing include verifying paper trails and equipment checks.

Programs vary regarding the amount and balance of inquiry, observation, and verification testing. Some programs depend on inquiry as the primary means of gathering audit evidence. Inquiry is easy, provides rapid feedback, and does not require as many resources. Many of the more sophisticated environmental audit programs (including three of the five programs in this study) conduct a considerable amount of verification testing to determine whether management systems and equipment perform as they are supposed to. For each item to be audited, inquiry typically takes a matter of minutes, observation can take tens of minutes, and testing a matter of hours. Thus, the more items to be verified, the larger the resource commitment required. Almost always, more items could be verified (and more ways to verify each item are possible) than available audit resources allow. However, environmental audits usually serve as a check on the environmental management system rather than as a substitute for it. Therefore, most audit programs do not look at every situation, item, or document.

### Step 4: Evaluate Audit Findings

Once evidence-gathering is complete, the audit findings and observations are evaluated. Audit evidence is reviewed in terms of program goals to determine both whether audit objectives were met and the significance of the audit findings.

While auditors usually make preliminary evaluations of their observations throughout the audit, most audit teams devote a few hours at the end of the audit to jointly discuss, evaluate, and finalize these tentative audit findings.

### Step 5: Report Audit Findings

The reporting process usually begins with an exit meeting between the audit team and facility personnel. During this meeting, the audit team communicates the observations and findings noted during the audit. Findings are then clarified and their ultimate disposition discussed.

Most companies (including all five in this study) prepare a written audit report. In most cases, the purposes of the report are to provide management with information about compliance status; to initiate corrective action; and to document how the audit was conducted, what it covered, and what was found.

Some companies prepare a draft of the audit report on-site. Most, however, prepare a draft audit report shortly after the on-site audit is completed. This draft usually undergoes review and comment before a final report is issued. Report reviewers often include the environmental affairs department, legal department, facility management, and the audit team.

The content of the audit report varies considerably from company to company. Typically, audit reports contain a background or introduction section which lists the purpose and scope of the audit and identifies the audit team leader, team members, and other key audit participants. Most audit reports include sections on the facility's overall compliance with regulations, as well as compliance with the corporation's policies and procedures. Some audit reports identify all applicable facility operations; some include a detailed description of the facility and its history, an impression of the facility management's ability to handle environmental crises, and/or recommendations and action plans.

The content of audit reports is strongly linked to the overall objective of the audit program. If the audit program is to provide assurance to management, the audit report often is limited to a factual description of the more significant findings and exceptions. On the other hand, if the goal of the audit program is to assist the facility manager, the audit report often is detailed enough to let the facility manager know precisely what was wrong and may include recommendations on how to improve the situation.

An effective reporting process communicates issues to appropriate persons within the company. Many companies have established a multiple or hierarchical reporting scheme. Under such a reporting process, the type of information and level of detail to be provided in an audit report depend on the problem identified and the individual who has to be notified. Some items may require reporting to corporate management and future follow-up; others may require only the attention of the facility manager.

Many companies' audit reports, including each of those in this study, receive a relatively wide distribution. Typically, audit reports are distributed to the manager of the audited facility and the corporate environmental affairs department. Some companies also distribute the report to various levels of operating and line management, the legal department, and the members of the audit team.

While much has been written about protecting the confidentiality of the audit report, most programs--especially those that conduct a large number of audits each year--do not routinely take elaborate steps to assert the confidentiality of the audit report. For example, the five firms in this study do not regularly take steps to preserve the confidentiality of their audit reports. Instead, care is taken in preparing the report and ensuring timely, appropriate follow-up. The audit report is typically treated as an internal management communication and distributed to those with a need to know.

### Audit Follow-Up

Most companies have established formal procedures for responding to the audit report. The action planning process is initiated as audit findings are identified. It can include assigning responsibility for corrective action; determining potential solutions and preparing recommendations to correct any deficiencies noted in the audit report; and establishing timetables. Typically, responses to the audit report are prepared by the facility manager and sent to management and the audit program manager for review. A few companies (and one in this study) incorporate the action plan into the final report.

Typically, action plans are monitored by an individual with responsibility for follow-up--generally either operating management, environmental affairs, or, in a few cases, the auditors. In most instances, follow-up involves a written or oral inquiry as to the status of the planned action. In companies where facilities are audited on a repeat basis within a specified time, the auditor or audit program manager is usually directly involved in, and central to, action plan follow-up. Where an audit team is unlikely to return to the facility for some time, operating management or environmental affairs usually assumes responsibility for follow-up. Audit program managers at two of the five companies in this report are responsible for audit follow-up.

## BASIC AUDIT TOOLS

The environmental audit process is most commonly supported by two important tools: the audit protocol and the working papers. While there is considerable latitude in current practice, most environmental auditing programs use some form of these two devices.

### Audit Protocols

Names for the various documents which guide the auditor while conducting the audit include audit protocols, audit work programs, review programs, checklists, and audit guides. In this discussion, the term "audit protocol" will be used.

An audit protocol represents a plan of what the auditor is to do to accomplish the objectives of the audit. It lists the audit procedures that are to be performed to gain evidence about environmental practices. An audit protocol also provides the basis for assigning specific tasks to individual members of the audit team, for comparing what was accomplished with what was planned, and for summarizing and recording the work accomplished. A well-designed audit protocol can also be used to help train inexperienced auditors and thus reduce the amount of supervision required by the audit team leader. Many companies use the audit protocol to help build consistency into the audit, particularly where rotating audit teams are used.

The audit protocol can be formatted in a variety of ways. For example, some companies use a protocol which organizes audit procedures into a sequence of audit steps and provides space for identifying team assignments and brief notations. Some use an outline which lists the topics to be covered during the audit but does not specify the precise manner in which each topic is to be reviewed. Still other companies may use a detailed guide (which emphasizes the basic regulatory requirements); a yes/no questionnaire (which incorporates most regulatory provisions into questions); or a scored questionnaire (which elicits numerical ratings in which responses are scored against previously developed criteria).

### Working Papers

Working papers document the work performed, the techniques used, and the conclusions reached by the auditors. Working papers help the auditor achieve the audit objectives and provide reasonable assurance that an adequate audit was performed consistent with audit program goals and objectives. Working papers often include documentation of compliance as well as non-compliance.

Working papers are usually handwritten and include photocopies of several documents selected by the auditor to help substantiate the audit's findings. They are written while performing the field work. Working papers are not a report that the auditor prepares from notes after the audit is complete; rather, they are the auditor's field notes to keep track of audit procedures undertaken, results achieved, and items requiring further information.

Most working papers include notes of audit planning; the completed copy of the audit protocol annotated with work paper references and auditor's initials; the completed internal control questionnaire, results of compliance testing, and evaluations of internal control; descriptions of all functional tests (e.g., performance of pollution control equipment) and transactional tests (e.g., documentation of hazardous waste shipments) conducted during the audit; documentation of all audit procedures and evidence obtained; and notes on any conferences. Some working papers also contain a listing of the facility's materials and their uses; copies of all regulatory permits for the environmental area under review; questionnaires and flow charts of internal controls; schedules of documentation and recordkeeping; and copies of previous audit findings and observations.

## SELECTED CASE EXAMPLES

Five innovative environmental auditing programs are profiled in the following sections of this report. These five programs have been selected as examples of current environmental auditing practices. While no five programs could capture the full array of current practices, the descriptions of the featured programs, thanks to the cooperation and candor of the participating companies, provide an in-depth look at the internal workings of established environmental auditing programs.

The five programs have also been selected because of their diversity in organization, staffing, scope and focus, and audit methodology. For example, the organizational diversity of the programs profiled is reflected both by where the program is housed within the organization and how the program is staffed. One program is housed within the Internal Audit Department; one program reports to the General Counsel. The remaining three are housed within the Corporate Environmental Department. However, two of these three programs have separate audit departments within this corporate group--and thus are not involved with the day-to-day responsibilities of environmental compliance.

Three of the companies in this report have full-time audit program managers; two have full-time staffs of environmental auditors; and three companies use a rotating staff of auditors from corporate or division environmental departments. One company also includes an outside consultant on each audit team.

As illustrated in the following sections of this report, there is also a variety of approaches to audit protocols or guides, to working papers and audit recordkeeping, and to reporting of audit findings. These profiles are intended to provide not only a better understanding of environmental auditing, but also useful models for firms seeking to establish or improve their environmental auditing programs.

# II. OLIN CORPORATION'S REGULATORY AUDIT PROGRAM

Olin Corporation's environmental audit program, called Regulatory Audits, started in 1978. A driving force leading to the program's creation was an incident in which the company learned that three employees had submitted false information to Olin management and government officials. This led to a mandate from the Chief Executive Office to improve controls over regulatory reporting. Another reason for the program was the Chief Executive Officer's increasing concern about the proliferation of environmental regulations. He felt that Olin's operating employees might not fully understand these regulations. Given the number of employees (17,000+), the number of divisions (6), the number of U.S. manufacturing facilities (52), and the diversity of its product lines (chemical, metals, specialty papers, ammunition, pool sanitizing products, and home building), this lack of understanding could lead to incidents that have a significant impact on Olin's business. The company viewed an audit program as a mechanism by which to evaluate the degree of compliance and impress upon all employees Olin's commitment to comply with all laws and regulations.

Olin's audit program has strong support from top management both publicly and internally. There are a number of examples of this support: a written corporate policy on Internal Auditing stating the major objectives of the Regulatory Audit Program; mention of the initiation of the program in the President's Message in Olin's 1978 Annual Report; and a yearly statement about the Regulatory Auditors at Olin's Annual Meeting of the stockholders. Although there is no formal written description of the audit program, the program is communicated throughout Olin by the CEO and top management via writings and during visits to the facilities. The audit program is also described frequently through articles in the company magazine.

Olin's program is called Regulatory Audits because the audit program includes a wide variety of legal and regulatory issues, not just environmental matters. The word "audit" is used because the program is specifically designed to be as rigorous, independent and objective as a financial audit. The program is housed within the Internal Audit Department and has a staff of five full-time auditors.

## BACKGROUND

Before describing the audit program, it is useful first to look at how Olin's environmental activities are managed. Olin has organizations at the corporate, division, and facility levels responsible for environmental affairs. While environmental affairs is largely a decentralized function, there is a small corporate department consisting of the Corporate Director of Environmental Affairs and Energy and one assistant. This staff group has responsibility for tracking environmental projects, consolidating reports to the Chief Executive Officer, and working on specific areas of concern to Olin management.

The basic environmental philosophy of Olin is that each of the Divisions is responsible for its environmental activities just as they are for other matters. To meet this responsibility, most divisions have established an environmental affairs department. These departments are responsible for: identifying key environmental, legislative, and regulatory issues; determining how these issues affect each of the division's facilities; and assisting facility personnel in developing methods for controlling and monitoring environmental activities.

The size of the environmental affairs department varies from division to division. The Chemicals Division has the largest divisional environmental affairs department with a staff of 23 employees. At the other end of the spectrum, the Housing Division uses local engineering consultants to advise it on environmental issues and does not have a separate environmental department. Within the six divisions, 35 people are directly concerned with environmental affairs. Division environmental groups are separate and autonomous from the Corporate Department, with no direct reporting relationship or accountability.

At each facility, at least one person is responsible for managing environmental activities. The size of the facility environmental staff varies, but typically there is one person full-time or half-time. Approximately 50 people within the facilities have environmental responsibilities.

## PROGRAM PURPOSE

Olin's audit program has four objectives:

- To determine that operating units are complying with laws and regulations;
- To determine that Corporate and operating units have established appropriate procedures to ensure compliance with laws and regulations;
- To verify that such systems and procedures are operating as planned; and
- To audit, on a test basis, the accuracy of governmental reports submitted by Olin.

These objectives were communicated to operating management in the Executive Bulletin that was distributed at the initiation of the audit program.

Olin has written corporate policies relating to environmental affairs. One is an environmental policy which states the roles and responsibilities of corporate management regarding environmental affairs. (See Exhibit 1.) All Olin corporate policies are initiated by a member of senior management who determines that a policy is required and then requests the Manager of Procedures to write the policy. The policy is then circulated to all divisions for comments. The final policy is approved by the CEO or other member of senior management and issued to all locations.

Olin believes the procedures and guidelines to comply with environmental regulations are basically contained within the regulations themselves. Thus, there are no written procedures or guidelines at the corporate or division level.

While there are no written procedures at the corporate or division level, the facilities have written policies and procedures in such areas as spill prevention (Spill Prevention Control and Countermeasures Plan), contingency plans, response plans, advice to employees on hazardous substances, etc. Facility policies are issued by the Facility Manager with the assistance of the Environmental Affairs Department and legal staff. These policies are updated as a result of process, product, or raw material changes. A procedure or guideline is updated, on average, about every two years. There are also written operating procedures at the facilities, where required, with specific instructions on what to do, such as start-up/shut-down procedures, sampling procedures, etc.

## ORGANIZATION AND STAFFING

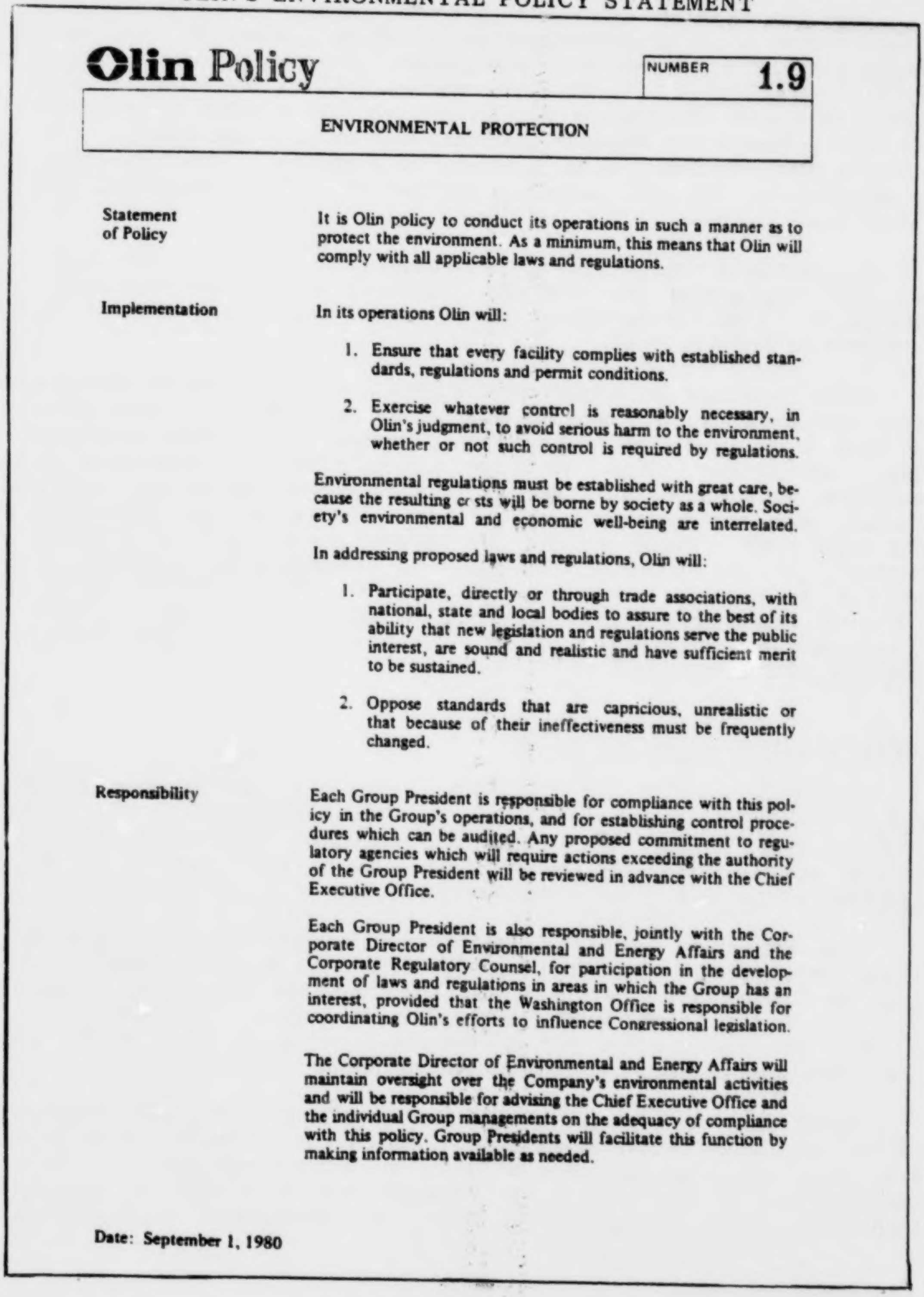
The Regulatory Audit Department, housed in the Internal Audit Department, is headed by the Manager, Regulatory Audits, one of a staff of five full-time auditors. The Manager, Regulatory Audits, reports to the Chief Internal Auditor who in turn reports to the Chairman of the Board and Chief Executive Officer. (See Figure 1.)

The Regulatory Audit Department is an independent group with no formal organizational connections to the divisions, or other departments such as Environmental Affairs. A communications linkage is created with the facility both during and after an audit. The Regulatory auditors also communicate with division and corporate legal staffs for the purpose of defining regulations and obtaining regulatory advice.

Audit team members are all full-time professional auditors assigned to the Regulatory Audit Department. All have a technical degree and most have ten years or more of plant or related experience. Other qualifications of the audit team members include a skill in inquiry techniques, good communications skills, and knowledge of regulatory

## EXHIBIT 1

## OLIN'S ENVIRONMENTAL POLICY STATEMENT



**Olin Policy**

NUMBER **1.9**

**ENVIRONMENTAL PROTECTION**

**Statement of Policy**

It is Olin policy to conduct its operations in such a manner as to protect the environment. As a minimum, this means that Olin will comply with all applicable laws and regulations.

**Implementation**

In its operations Olin will:

1. Ensure that every facility complies with established standards, regulations and permit conditions.
2. Exercise whatever control is reasonably necessary, in Olin's judgment, to avoid serious harm to the environment, whether or not such control is required by regulations.

Environmental regulations must be established with great care, because the resulting costs will be borne by society as a whole. Society's environmental and economic well-being are interrelated.

In addressing proposed laws and regulations, Olin will:

1. Participate, directly or through trade associations, with national, state and local bodies to assure to the best of its ability that new legislation and regulations serve the public interest, are sound and realistic and have sufficient merit to be sustained.
2. Oppose standards that are capricious, unrealistic or that because of their ineffectiveness must be frequently changed.

**Responsibility**

Each Group President is responsible for compliance with this policy in the Group's operations, and for establishing control procedures which can be audited. Any proposed commitment to regulatory agencies which will require actions exceeding the authority of the Group President will be reviewed in advance with the Chief Executive Office.

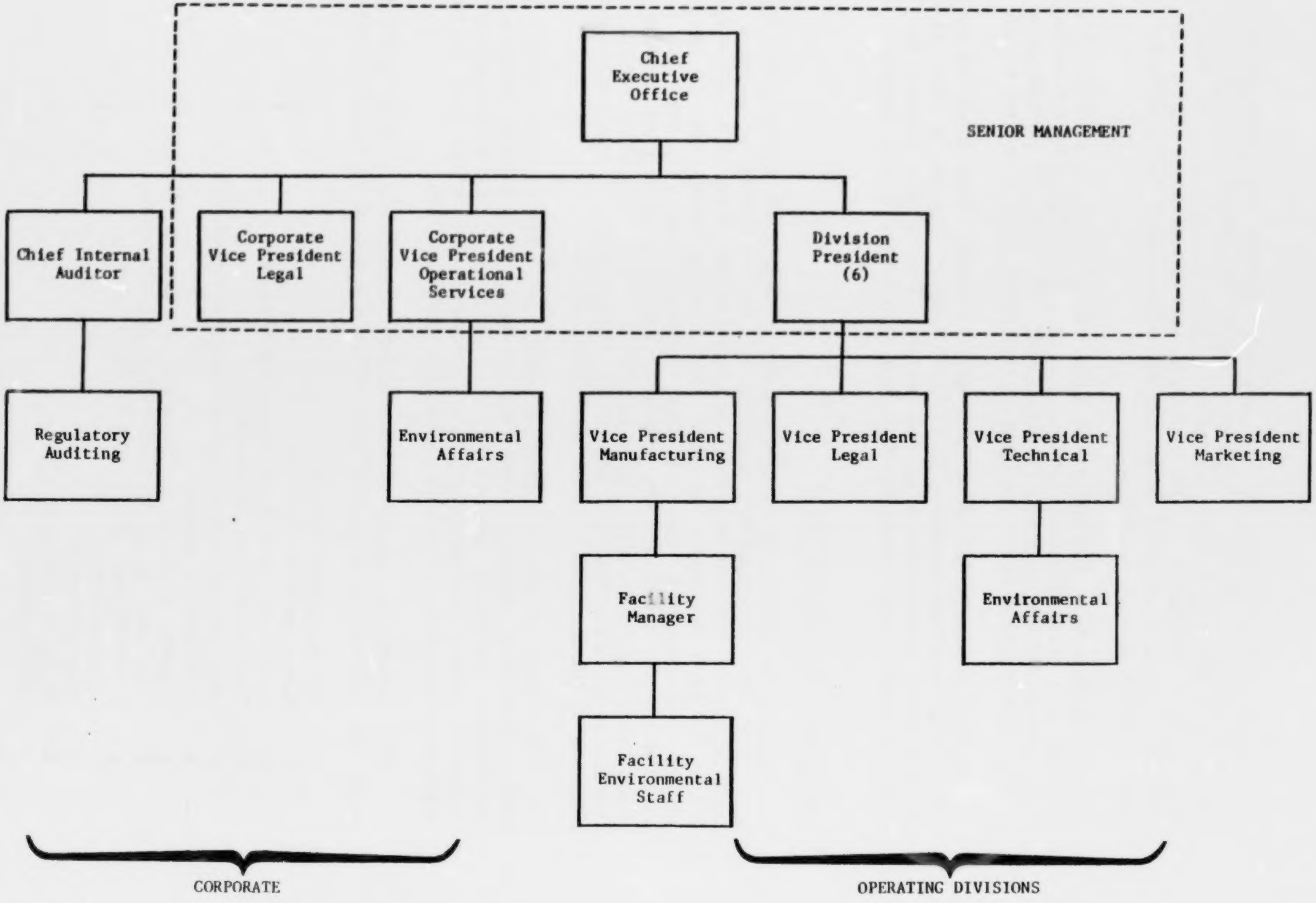
Each Group President is also responsible, jointly with the Corporate Director of Environmental and Energy Affairs and the Corporate Regulatory Counsel, for participation in the development of laws and regulations in areas in which the Group has an interest, provided that the Washington Office is responsible for coordinating Olin's efforts to influence Congressional legislation.

The Corporate Director of Environmental and Energy Affairs will maintain oversight over the Company's environmental activities and will be responsible for advising the Chief Executive Office and the individual Group managements on the adequacy of compliance with this policy. Group Presidents will facilitate this function by making information available as needed.

**Date: September 1, 1980**

## FIGURE 1

## REGULATORY AUDITING RELATIONSHIPS


Chief Executive Office
SENIOR MANAGEMENT
Chief Internal Auditor
Corporate Vice President Legal
Corporate Vice President Operational Services
Division President (6)
Regulatory Auditing
Environmental Affairs
Vice President Manufacturing
Vice President Legal
Vice President Technical
Vice President Marketing
Facility Manager
Environmental Affairs
Facility Environmental Staff
CORPORATE
OPERATING DIVISIONS

procedures and requirements. There are written job descriptions for each individual within the Internal Audit Department which include criteria for the audit team members. (See Exhibit 2.) In addition, each auditor prepares yearly written self-objectives. Olin has an extensive 78-page written audit manual which lists the standards and criteria the auditor is to follow.

Olin's Manager, Regulatory Audits, is active in a variety of professional and trade associations, ad-hoc groups, and informal networks where environmental auditing is discussed. He sees his participation as helping communicate to others outside Olin what Olin is trying to do.

Audits generally last five days with typically three auditors on the team. The staffing objective is to have enough people on the team to get the audit accomplished in one week. The yearly budget for the audit program is approximately $400,000 with five full-time people.

## AUDIT SCOPE AND FOCUS

The scope and focus of Olin's audit program are broad and include both U.S. and international locations. Joint ventures or off-site disposal activities are not regularly included since these are the responsibility of each division. However, the audit program has the responsibility for ensuring that off-site disposal activities are, in fact, handled by the division. On occasion, the audit team goes outside the plant boundary to a third-party terminal. This, however, would be a special audit with specific objectives which may or may not include portions of the functional scope described below.

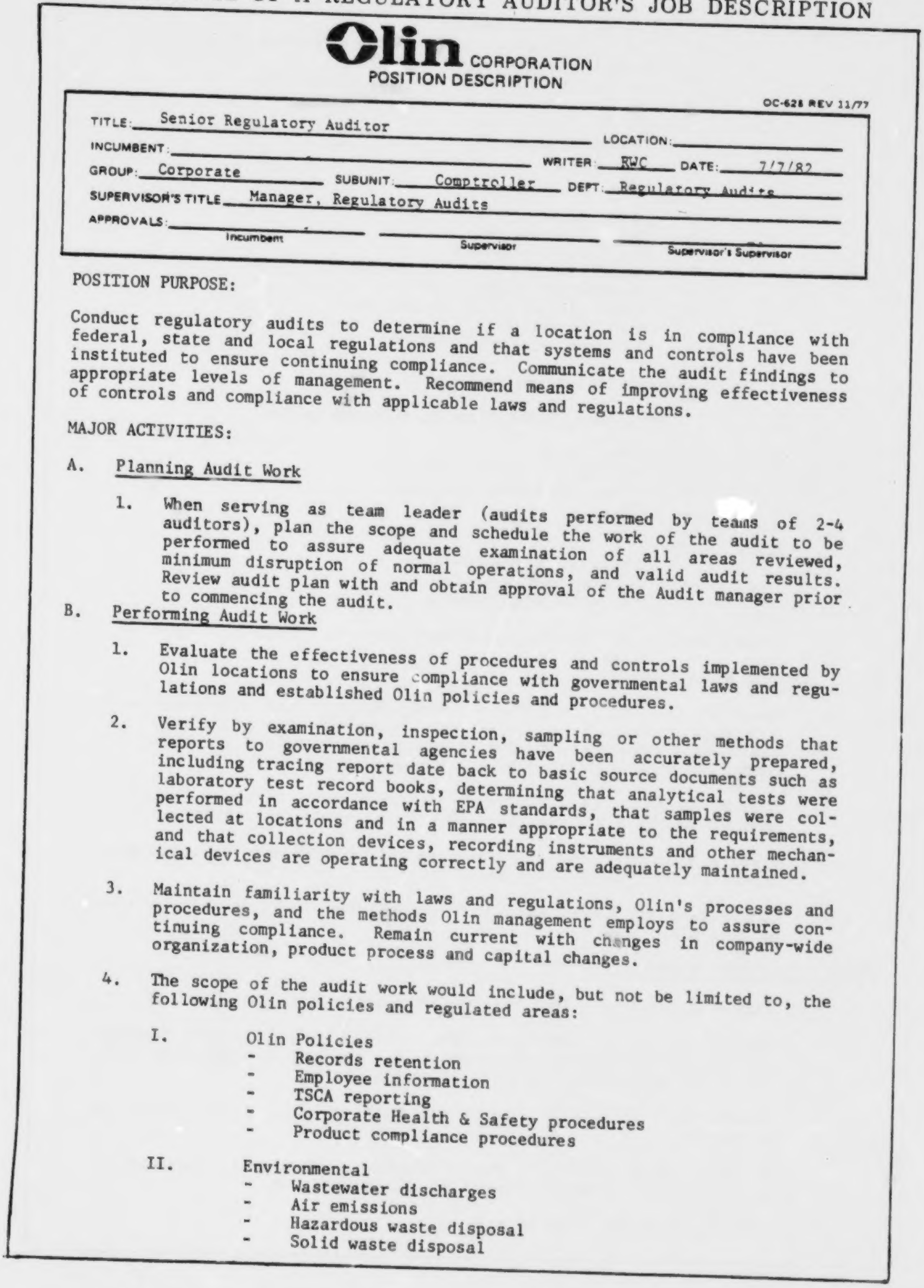
The scope of each individual audit includes federal, state, and local regulations; permits; corporate, division, and facility policies and procedures; corporate records and technical data; environmental control systems; quality assurance programs; codes; contractual and licensing requirements; and, occasionally, hazard identification.

The functional scope of the audit program and each individual audit can include up to 40 subjects within the following broad topics:

- Air pollution control
- Water pollution control
- Solid and hazardous waste management
- Polychlorinated biphenyls
- Spill prevention control and countermeasures
- Radioactive wastes
- Federal Insecticide, Fungicide & Rodenticide Act
- Food and Drug Administration requirements
- Occupational safety and health issues
- Transportation
- Import/Export
- Equal Employment
- Coast Guard

## EXHIBIT 2

## AN EXAMPLE OF A REGULATORY AUDITOR'S JOB DESCRIPTION



**Olin** CORPORATION
POSITION DESCRIPTION

OC-628 REV 11/77

TITLE: Senior Regulatory Auditor
INCUMBENT: ______ LOCATION: ______
GROUP: Corporate WRITER: RWC DATE: 7/7/82
SUBUNIT: Comptroller DEPT: Regulatory Audits
SUPERVISOR'S TITLE: Manager, Regulatory Audits
APPROVALS: ______ Incumbent ______ Supervisor ______ Supervisor's Supervisor

POSITION PURPOSE:

Conduct regulatory audits to determine if a location is in compliance with federal, state and local regulations and that systems and controls have been instituted to ensure continuing compliance. Communicate the audit findings to appropriate levels of management. Recommend means of improving effectiveness of controls and compliance with applicable laws and regulations.

MAJOR ACTIVITIES:

A. Planning Audit Work

1. When serving as team leader (audits performed by teams of 2-4 auditors), plan the scope and schedule the work of the audit to be performed to assure adequate examination of all areas reviewed, minimum disruption of normal operations, and valid audit results. Review audit plan with and obtain approval of the Audit manager prior to commencing the audit.

B. Performing Audit Work

1. Evaluate the effectiveness of procedures and controls implemented by Olin locations to ensure compliance with governmental laws and regulations and established Olin policies and procedures.

2. Verify by examination, inspection, sampling or other methods that reports to governmental agencies have been accurately prepared, including tracing report date back to basic source documents such as laboratory test record books, determining that analytical tests were performed in accordance with EPA standards, that samples were collected at locations and in a manner appropriate to the requirements, and that collection devices, recording instruments and other mechanical devices are operating correctly and are adequately maintained.

3. Maintain familiarity with laws and regulations, Olin's processes and procedures, and the methods Olin management employs to assure continuing compliance. Remain current with changes in company-wide organization, product process and capital changes.

4. The scope of the audit work would include, but not be limited to, the following Olin policies and regulated areas:

I. Olin Policies
   - Records retention
   - Employee information
   - TSCA reporting
   - Corporate Health & Safety procedures
   - Product compliance procedures

II. Environmental
   - Wastewater discharges
   - Air emissions
   - Hazardous waste disposal
   - Solid waste disposal

EXHIBIT 2 (continued)

- Polychlorinated biphenyls
- Oil Spill Prevention Countermeasure and Control
- Hazardous substances spills
- Radioactive material handling procedures

III. Pesticides
  - Regulated controls
  - Labeling

IV. OSHA
  - Drinking water
  - Safety inspections
  - Respiratory programs
  - Noise controls
  - Maintenance inspections
  - Fetal vulnerability protection
  - Fire protection
  - Accident reporting

V. Transportation Requirements

VI. Export/Import Classification & Documentation

VII. Equal Employment
  - Affirmative action programs
  - Alien employment procedures
  - CETA

VIII. Other
  - Coast Guard requirements
  - Housing regulations
  - Gun sales and licenses

5. Oversee activities of less experienced auditors assigned to audit team.

C. Reporting Audit Findings

1. Based on the audit findings, conduct thorough exit discussion with location personnel and management regarding those findings and resulting recommendations and suggestions for improving systems of compliance with laws and regulations and Olin procedures.

2. Ensure, by means of the above discussion and others, as required, that all findings are accurate and reflect regulatory requirements.

3. Prepare a draft report of recommendations and suggestions; submit report to the Manager, Regulatory Audits.

4. Communicate all concerns to the Manager, Regulatory Audits, as soon as possible.

OTHER SIGNIFICANT FACTORS:

- Degree is required. Technical degree preferred.

- Minimum ten years' work experience, preferably in Olin, the Chemical industry or auditing or two years as either an Olin regulatory auditor as an environmental auditor in another firm.

- Demonstrated ability to communicate both in writing and orally is mandatory.

- Personal characteristics: mature judgment, intelligent, inquisitive, analytical, levelheaded, assertive, and imaginative.

- Willing to travel 30 to 40 percent.

- Bureau of Alcohol, Tobacco & Firearms
- Housing
- Federal Communication Commission requirements

The audit team typically spends much of its time during the audit reviewing environmental issues. For example, a review of water discharges may account for 25 percent of the audit team's time at the facility. Auditing air emissions may take another 20 percent, and auditing solid and hazardous waste disposal a further 20 percent. Approximately 12 percent of the time is devoted to OSHA inspections, with the remaining time spent reviewing affirmative action, pesticides, and other regulatory areas.

While the scope of the audit program is broad, the audit department works to avoid duplication with other corporate efforts. Other departments (such as Environmental Affairs, Safety, Industrial Hygiene, and Quality Assurance) perform periodic reviews. The Audit Department uses the results of these reviews as input to its own audit efforts to determine compliance. For example, the audit team does not perform an in-depth OSHA audit. Each division's Safety Department performs safety evaluations. The Audit Department reviews these evaluations to determine whether the evaluations and recommendations have been implemented by the facilities. Similarly, because Quality Assurance Department conducts reviews to ensure that samples are correctly analyzed, the Audit Department does not take samples for analysis. The audit also includes those areas not covered by the safety evaluations; for example, documentation of crane and hoist inspections, and verifying the OSHA 200 Log (a log of all recordable occupational injuries and illnesses).

## AUDIT TIMING AND FREQUENCY

During the first year of the audit program, 53 audits each covering up to 40 regulated subjects were conducted. Seventy-two audits were conducted in both 1980 and 1981; in 1982, some 65 audits were conducted. Fifty audits were conducted in 1983. The number of audits increased in 1980 because the President of the Chemicals Division had requested that all chemical facilities be reviewed every six months. After auditing the chemical facilities at six-month intervals, the Audit Department recommended that the frequency of audits at these locations be reduced back to an annual audit. The program is now operating on an average of one-year audit cycle for all facilities. However, for facilities with greater regulatory exposure, the audit frequency may be accelerated. Since all facilities are audited on a yearly cycle, the period under review covers the time since the prior audit or the prior calendar year.

At the request of the Chairman of the Board, all audits since December 1982 have been "surprise" audits, with a lead time of only a couple of days. The Chairman of the Board views surprise audits as providing a more accurate picture of the plant's operations. All locations have been notified in writing of this change in the audit program.

## AUDIT METHODOLOGY

Olin's audit program is formal, comprehensive, in-depth, documented, and independent (both from the facility being audited and from the person receiving the audit report).

The primary emphasis of the audit is to verify that a location is in compliance with applicable regulations. This requires an in-depth review and detailed documentation. Some regulations, such as those for fuel usage, do not require operating records or governmental reports. Compliance with these regulations is reviewed by Olin's regulatory auditors in a predetermined manner. To ensure this is done, Olin has developed separate formal audit programs (or protocols) for each audit subject related to the functional subjects of the audit. Each program includes the basic steps the auditor must follow and guides the auditor by including both regulatory requirements and internal controls related to each subject. Olin not only has audit programs for each basic audit topic, but also has them for some aspects that other corporate programs might not normally consider. For example, Exhibit 3 is an excerpt of an audit program for fuel and fuel additives. By following this program and documenting each step, the auditor ensures that all critical regulatory points are reviewed and documented.

Most regulated areas require reports to be submitted to the government or records to be kept for inspection. The audit programs (protocols) for these subjects use the reports and records as vehicles for determining whether the location is complying with regulations. Olin has adopted this approach because it perceives the reports and records to be the most direct and tangible communication with government agencies. The reports and records are reviewed in depth and the controls used to prepare the reports are assessed in order to ensure that they are accurate and reflect the true operation of the company.

As an example, when a waste water audit is performed, the "Discharge Monitoring Report" may be the vehicle for review. It is compared with the NPDES permit to ensure that it contains the necessary data, parameters, and outfalls. Then, the data on the report is traced to base data and all calculations are checked.

A determination is made as to whether all data are supported by analytical tests and the tests themselves are monitored to ensure that they meet agency requirements. Sample collection procedures are observed to ensure samples are taken from the correct place and by the specified method. Sample protection and delivery methods are reviewed. Any discrepancies in sampling method, collection or protection and in analysis, computation or translation of data are noted to indicate a potential system weakness which could result in inaccurate reporting to government agencies. Technical, systematic or administrative improvements are recommended to correct or counteract any potential weaknesses.

# EXHIBIT 3

# AUDIT PROGRAM FOR FUEL AND FUEL ADDITIVES

OLIN CORPORATION--INTERNAL AUDIT DEPARTMENT
REGULATORY AUDIT PROGRAM II-i
FUEL AND FUEL ADDITIVES
November, 1981

## OBJECTIVES

The objectives of the fuel and fuel additives audit program are to determine that:

- Procedures are in place to prevent the introduction of leaded gasoline into any motor vehicle marked unleaded fuel only.
- Proper notices are posted at Olin-owned gasoline dispensing facilities.
- Gasoline dispensing facilities conform to regulatory requirements.

## GENERAL

Federal regulation prohibits wholesale purchasers of gasoline from introducing leaded gasoline into any vehicle which has been designed for use of unleaded fuel only. Regulation also requires that gasoline dispensing pumps be labeled and that dispensing nozzles meet specific requirements so that a regular gasoline nozzle will not fit the fill tube of a vehicle designated for use of unleaded gasoline.

Ref. 40 CFR 80.22

## AUDIT PROGRAM

| AUDITOR | W/P |
|---|---|
| | |

1. Determine and note in workpapers if the location has gasoline dispensing facilities. If there are no such facilities, proceed no further--the regulations upon which this audit program is based do not apply. Otherwise continue.

2. Review the invoice file(s) for all purchases of gasoline since the prior audit. Note in the workpapers the quantity of each type of gasoline purchased.

3. Obtain for the workpapers a listing of all company-owned vehicles that use gasoline. Note the type of gasoline each vehicle should use.

4. Determine if there is a log maintained of gasoline dispensed and if it indicates the vehicle into which it was dispensed. If it is noted that any regular gasoline was dispensed into a vehicle that requires unleaded gasoline, a recommendation must be made.

5. Examine the gasoline dispensing facilities and determine:

   a. That the nozzle for dispensing regular gasoline is greater than .930 inches in diameter.

   b. That the nozzle for dispensing unleaded gasoline is less than .840 inches in diameter and that the terminating end has a straight section at least 2.5 inches in length and that the nozzle has a retaining spring that ends 3.0 inches from the terminal end.

   c. That EACH gasoline pump has prominently displayed a label that reads exactly as follows:

      > Federal law prohibits the introduction of any gasoline containing lead or phosphorous into any motor vehicle labeled "UNLEADED GASOLINE ONLY."

   d. That each gasoline pump used for dispensing unleaded gasoline has a label stating UNLEADED GASOLINE.

   e. That each gasoline pump used for dispensing regular gasoline has a prominently displayed label that states: CONTAINS LEAD ANTI-KNOCK COMPOUNDS.

In addition to the audit programs used by the auditors for each functional subject, other techniques used by the auditors in conducting the audit include physical observation, examination, and investigation. Not included in the conduct of the audit are chemical analyses and physical tests.

## Steps in the Audit Process

The basic audit steps include the following:

(1) Before beginning the audit, the audit team leader determines which member of the audit team will review which subjects. The more detailed subjects are reviewed first.

(2) At the beginning of the audit, the team meets with the facility manager to determine particular concerns or questions that the facility manager may have.

(3) The team then meets with the facility staff to answer any questions they may have regarding the audit and to determine each staff member's responsibilities.

(4) Included in every audit is a tour of the facility to observe the production processes; to gain an overall impression of the facility's working environment, potential safety hazards; and to observe changes in operations or procedures. Chemical usage and exposure situations are noted, as well as noise levels, material handling equipment, aisle clearance, fire prevention, and machine guarding devices.

(5) The audit team members carefully follow the written audit programs and review the plant's regulatory activities, analyze the facility's environmental reports and files, and test the accuracy of selected governmental reports. Observations are noted in the auditor's working papers along with the evidence collected and the audit programs are annotated and the working papers are referenced. The auditors' activities involve interacting with several departments (Safety and Medical, Personnel, Manufacturing, Quality Assurance, Engineering, Purchasing, Maintenance, and Shipping).

(6) The members of the audit team then discuss their findings with the facility's department managers.

(7) The audit is concluded with a one to two hour exit interview with the facility manager and his staff. This interview provides facility personnel an opportunity to ensure that the audit team's observations are complete and consistent with all the facts, and that the audit team has interpreted the facts correctly.

## ASSURING AUDIT QUALITY

Quality control and quality assurance of the audit program are an ongoing effort. Having five people perform audits can result in differences in interpreting findings and in report emphasis. To overcome this problem, checks and balances are built into the audit program. For example, the Manager, Regulatory Audits, reviews each audit report with the report's author to ensure equal emphasis is given to equal problems. The Manager, Regulatory Audits, also monitors the team's activities during both the audit and the follow-up after the audit. Reports are also reviewed by members of the legal staff so that interpretations of the regulations by the auditors are accurate and complete.

## AUDIT REPORTING

Olin's reporting process has evolved over the life of the audit program. Prior to January 1982, Olin's written audit report consisted of brief points in outline form identifying areas of concern. The current reporting process, in place since January 1982, was initiated at the request of facility management who had difficulty understanding the previous reporting process.

An audit report has three basic purposes: to report the findings of the audit, to provide a basis for formal acceptance of the findings by operating management, and to initiate corrective action.

### Reporting Process

Olin's audit reporting process consists of the following steps:

(1) An exit interview is held with the facility manager and his staff at the completion of the audit. Audit work is reviewed and recommendations given. A dialogue is encouraged to ensure all facts were obtained and correctly understood.

(2) The audit team returns home and the lead auditor prepares a draft of the audit report.

(3) This draft report is reviewed by the Regulatory Audit Manager and the Chief Internal Auditor for content and clarity.

(4) The draft is then reviewed by the division regulatory lawyer to ensure legal references are correctly stated and applied.

(5) The draft is sent to the facility manager, his immediate supervisor, and the Division Regulatory Coordinator for review. They are given two weeks to respond to the draft.

(6) Any disagreements with the report's findings and recommendations are resolved through discussions with the facility manager. However, if conflicts remain, the Chief Internal Auditor reviews the issues with higher levels of management until all issues are resolved.

(7) After the draft is reviewed and differences resolved, the final report is issued to the facility manager and his immediate supervisor, Group President, operating company Vice President, Legal, and Environmental Affairs. This is usually 30 days after the field work ends.

Report Content

The audit report includes a listing of all topics audited and all conclusions reached. Specific findings are listed; recommendations to correct deficiencies are provided; and areas which could be improved which were brought to management's attention during the audit are listed. In addition, the report also lists those practices of the facility which have been reviewed and found to be adequately handled. An outline of Olin's report is given below.

### OUTLINE OF OLIN'S AUDIT REPORT

I. Audit Scope

- When the audit was conducted
- What was audited

II. Questions of Regulatory Compliance

- Findings are identified relative to regulatory compliance
- Specific recommendations are given

III. Compliance with Procedures

- Findings are identified relative to corporate procedures
- Specific recommendations are given

IV. Improvement in Controls Over Regulated Matters

- Findings are identified relative to the presence and security of administrative, technical or other controls
- Specific recommendations are given

V. Items Brought to Management's Attention

- Regulatory or procedural findings which were immediately fixed
- Minor regulatory or procedural findings with a commitment to fix
- Audit team's observations

VI. Other Items Reviewed

- Listing of areas looked at and found to be in good order

An example of Olin's report format and language is provided in Exhibit 4.

### Follow-Up

The audit report specifies that within 60 days of the issuance of the final report, the addressees will describe corrective actions taken or contemplated. The response is addressed to the Division President and a copy sent to the Manager, Regulatory Audits and all who have received copies of the report. Olin policy states that internal auditing is a staff function and the internal auditor has no direct responsibility for, or authority over, any of the activities which are reviewed. Therefore, the internal audit review and appraisal do not in any way relieve other persons of responsibilities assigned to them. Each division is responsible for corrective actions. The Division Coordinator is responsible for follow-up and does so on a periodic basis to insure that corrective actions are proper and effective, and that implementation is timely.

In a repeat audit of a facility, the audit report will include a statement concerning actions taken or not taken on recommendations from past audits. Repeat recommendations from prior audits are reported to the Chief Executive Office who will personally communicate with the location to emphasize management's commitment to comply with the laws and regulations and to emphasize the company's commitment to correct problems.

### Records Retention

Olin has a formal, written records retention policy. The permanent file working papers (continuing permits, letters, etc.) are kept indefinitely. The audit working papers (notes of audit tests and findings) are destroyed after the facility response is received. The draft audit report is retained until the final report is issued. The final report is retained for ten years.

## PROGRAM BENEFITS AND DEVELOPMENTS

From the perspective of the audit program manager, several benefits have accrued to Olin as a result of the audit program. Top management has assurance that employees realize that Olin is committed to obeying the laws and regulations. As a result of the audit program, the number of excursions has decreased. Moreover, there is certainty that all excursions are reported. The Legal Department feels that the observations provided by the regulatory auditors help them do a better job and result in issues being clarified more quickly. Olin feels that its image with regulatory agencies has improved considerably. From management's perspective, Olin has a much more secure environmental organization. Further, Olin's Manager, Regulatory Audits, sees his participation in various professional and trade associations and ad-hoc groups as helping to improve Olin's audit program by observing what other companies are doing and by testing new ideas with other companies.

## EXHIBIT 4

## EXAMPLE OF OLIN'S AUDIT REPORT

OC 277 REV. 6/83

### REGULATORY COMPLIANCE AUDIT REPORT

| | |
|---|---|
| HYPOTHETICAL PLANT*<br>OPERATING DIVISION<br>HOMETOWN, U.S.A. | DATE<br>February 28, 1980<br>REPORT NUMBER<br>80-12-RA<br>RELEASED BY<br>Chief Internal Auditor |

Addressees are requested to prepare a reply stating the action taken on all numbered recommendations. This reply is due April 30, 1980.
*Address reply to* ______________ *and send copies to all others receiving the report.*

Addressees:

Location Manager
Director, Operations

Copy to:

Group President
Group Vice President, Operations
Corporate Director, Environmental Affairs
Corporate Regulatory Lawyer
Corporate Mgr., Regulatory Audit.
Others, if pertinent -
  Director, Safety
  Director, Transportation
  Director, Medical

AUDIT SCOPE

During the period January 10 to January 18, 1980, we reviewed the procedures and controls at the Hypothetical plant of the Operating Group in Hometown, U.S.A. to ascertain the location's efforts relative to compliance with governmental laws and regulations and related procedures in the subjects listed below. We discussed regulated activities with appropriate personnel, reviewed procedures used to ensure compliance and made tests to determine if procedures and related controls were operating as intended. We reviewed actions taken on recommendations made during our prior audit. We checked to determine if records management procedures were operating in accordance with Corporate Standard Procedure (CSP) 30 and if reports had been prepared and signed in accordance with CSP 51. We discussed our findings with local and Group personnel to ensure that all relevant information had been obtained.

QUESTIONS OF REGULATORY COMPLIANCE

1. Hazardous Waste Storage Inspections - Federal regulation 40 CFR 265.15 requires a weekly inspection of hazardous waste storage areas. 40 CFR 265.15(d) requires these inspections be recorded in a log. We noted that the records indicated that inspections had been conducted at three week intervals during the three month period prior to our audit. We repeat our recommendation made during the prior audit (Report No. 79-3-RA, dated February 30, 1979) that weekly inspections of hazardous waste storage sites be conducted and documented in compliance with the regulation.

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*This report was prepared for purposes of this study. The comments contained herein are for illustrative purposes only and do not reflect operating situations, actual or implied.

## EXHIBIT 4 (continued)

-2-

2. PCB Transformer Inspections - 40 CFR 761.30(a)(1) ii and iv) require that PCB transformers in use be inspected every three months and that records of the inspection be retained. We were informed that PCB transformers at the boiler house were inspected monthly. However, we reviewed the inspection records for the calendar year 1982 and were able to locate documentation for only two inspections. We recommend that all PCB transformers be inspected at least once every three months and the records of these inspections be maintained in accordance with the regulation.

3. Radioactive Material Storage Control - Regulation 10 CFR 20.207 requires that licensed materials stored in an unrestricted area be secured from unauthorized removal. We noted that licensed materials were stored in an unrestricted area in an unlocked cabinet and refrigerator. We recommend that radioactive sources be secured as required in accordance with the regulation.

### COMPLIANCE WITH PROCEDURES

4. Medical Records Access Procedures - Procedure No. IV-3 of the Corporate Health and Safety (CH&S) Manual requires employees be advised of their right of access to personal medical records. However, we noted there was no formal procedure to control and document requests for access or for other requirements stated in the Corporate procedure. We recommend that a procedure be established and implemented for control of employee access to medical records as defined in Procedure No. IV-3 of the CH&S Manual.

5. Credential/Performance Information Access - CSP 31 requires a written procedure to ensure that only the credential/performance section of employees' personnel files are made available to supervisors for review in filling an open position. This procedure is to be posted at the personnel files. The location did not have this written procedure. We recommend a procedure be prepared and posted in conformance with CSP 31 requirements.

### ITEMS BROUGHT TO MANAGEMENT'S ATTENTION

Hazardous Waste Storage Log - We reviewed the controls which had been implemented by the location to ensure compliance with RCRA hazardous waste regulations. We reviewed the procedure to categorize, collect and store hazardous waste. We examined the temporary storage areas and the approved waste storage site. We reviewed the storage and disposal log. We noted that the purchase date of certain raw materials had been incorrectly used to indicate fill start date for containers of hazardous waste. Management accepted our suggestion to revise their procedure by dating containers when they were determined to first contain waste.

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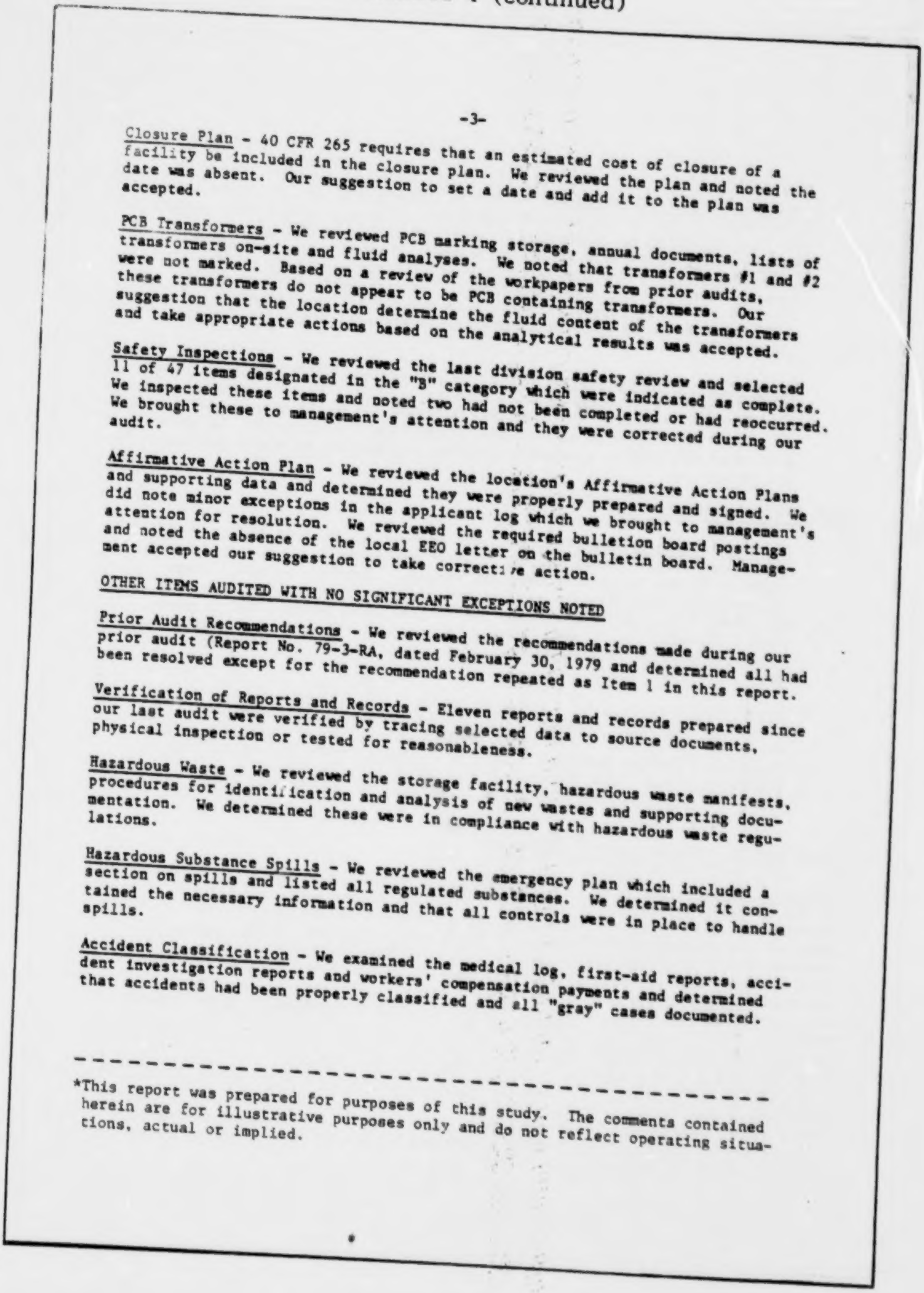
*This report was prepared for purposes of this study. The comments contained herein are for illustrative purposes only and do not reflect operating situations, actual or implied.

## EXHIBIT 4 (continued)



-3-

Closure Plan - 40 CFR 265 requires that an estimated cost of closure of a facility be included in the closure plan. We reviewed the plan and noted the date was absent. Our suggestion to set a date and add it to the plan was accepted.

PCB Transformers - We reviewed PCB marking storage, annual documents, lists of transformers on-site and fluid analyses. We noted that transformers #1 and #2 were not marked. Based on a review of the workpapers from prior audits, these transformers do not appear to be PCB containing transformers. Our suggestion that the location determine the fluid content of the transformers and take appropriate actions based on the analytical results was accepted.

Safety Inspections - We reviewed the last division safety review and selected 11 of 47 items designated in the "B" category which were indicated as complete. We inspected these items and noted two had not been completed or had reoccurred. We brought these to management's attention and they were corrected during our audit.

Affirmative Action Plan - We reviewed the location's Affirmative Action Plans and supporting data and determined they were properly prepared and signed. We did note minor exceptions in the applicant log which we brought to management's attention for resolution. We reviewed the required bulletion board postings and noted the absence of the local EEO letter on the bulletin board. Management accepted our suggestion to take corrective action.

OTHER ITEMS AUDITED WITH NO SIGNIFICANT EXCEPTIONS NOTED

Prior Audit Recommendations - We reviewed the recommendations made during our prior audit (Report No. 79-3-RA, dated February 30, 1979 and determined all had been resolved except for the recommendation repeated as Item 1 in this report.

Verification of Reports and Records - Eleven reports and records prepared since our last audit were verified by tracing selected data to source documents, physical inspection or tested for reasonableness.

Hazardous Waste - We reviewed the storage facility, hazardous waste manifests, procedures for identification and analysis of new wastes and supporting documentation. We determined these were in compliance with hazardous waste regulations.

Hazardous Substance Spills - We reviewed the emergency plan which included a section on spills and listed all regulated substances. We determined it contained the necessary information and that all controls were in place to handle spills.

Accident Classification - We examined the medical log, first-aid reports, accident investigation reports and workers' compensation payments and determined that accidents had been properly classified and all "gray" cases documented.

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*This report was prepared for purposes of this study. The comments contained herein are for illustrative purposes only and do not reflect operating situations, actual or implied.

EXHIBIT 4 (continued)

TSCA 8(e) - We noted that the reporting procedure for TSCA 8(e) Substantial Risk Notification Procedure was posted on the bulletin board.

Air Emissions - We determined that emissions from building ventilators were below emission rates which trigger permit requirements. We also determined that the boiler rating was less than that for which the regulations require permitting and monitoring. We noted the gas/oil-fired boilers were registered. We determined that the operating certificate renewal inspection had been made and the state had exempted recent boiler modifications from construction permit requirements.

Shipping - We reviewed the shipment of hazardous materials from the facility. We noted the identification, classification and labeling of each of the items shipped and compared the bill of lading and description with the tariff book. We tested the controls and determined they were in operation as intended.

Manager, Regulatory Audits

Participating in the Audit:
Regulatory Auditor
Senior Regulatory Auditor

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*This report was prepared for purposes of this study. The comments contained herein are for illustrative purposes only and do not reflect operating situations, actual or implied.

The environmental management systems have been further developed with an increase in the number of procedures and guidelines. Facility management views the audit program as providing help and assistance by forewarning them of potential problems.

The audit program is constantly adjusting to new needs both from within and outside of Olin. However, Olin does not anticipate changing its audit program other than adding compliance requirements based on new regulations.

# III. ALLIED CORPORATION'S HEALTH, SAFETY, AND ENVIRONMENTAL SURVEILLANCE PROGRAM

The impetus for Allied Corporation's Health, Safety & Environmental Surveillance program came in 1978 when a special committee of the Board of Directors approved a recommendation by its outside consultant to develop an environmental auditing program. This recommendation followed a corporate-wide assessment of the health, safety, and environmental status of its operations. In response to that recommendation, the corporate health, safety, and environmental affairs staff, the Corporate Audit Department, the Law Department, and the consultant, with the cooperation of business and operating managers, devised a program called the Health, Safety & Environmental Surveillance Program.

Allied's audit program is housed as a separate activity within the Corporate Health, Safety & Environmental Sciences Department. There are three full-time environmental auditors who comprise the Health, Safety & Environmental Surveillance staff. Each audit team includes at least one member of the Surveillance staff, an outside consultant, and may include a corporate and operating company environmental professional. The Director of the Surveillance Program and the consultant routinely report on the status of the program to Allied's Board of Directors.

## BACKGROUND

Over the past few years Allied Corporation has changed not only its name (from Allied Chemical Corporation) but also the breadth and focus of its operations (from a multi-million dollar chemical company to a multi-billion dollar diversified corporation--of which chemicals represent only 20% of total sales).

The corporation, with about 400 North American manufacturing facilities and 120,000 employees, is organized into five sectors: Chemicals, Oil and Gas, Automotive, Aerospace, and Industrial and Technology (diversified manufacturing operations).

The Corporate Health, Safety, and Environmental Sciences Department is headed by a Vice President who reports to the Senior Vice President, Corporate Technology. The department has 34 full-time staff organized into the following major disciplines:

- Pollution Control--responsible for air pollution control, water pollution control, solid and hazardous waste disposal, water supply and spill prevention;
- Product Safety--responsible for product safety and product quality programs;
- Occupational Health--responsible for industrial hygiene;
- Medical Sciences--responsible for employee medical programs;
- Safety and Loss Prevention--responsible for worker safety and prevention of property losses; and
- Environmental Surveillance--responsible for the environmental auditing function.

These functions are supported by a toxicology laboratory staffed by 44 scientists and support personnel.

Each of the above groups is headed by a director and staffed with experienced professionals. The responsibilities of this corporate department are overall coordination of and guidance to the sectors and operating companies, program monitoring, and regulatory affairs interaction.

Each sector has environmental, health, and safety staff (structured similarly to that of the corporate staff) with day-to-day responsibilities for health, safety, and environmental compliance in their sector. Each group is headed by a director who reports at a high level within the sector organization. A dotted-line reporting relationship exists with corporate counterparts. Staff assigned to specific facilities report to facility management but have a dotted-line reporting relationship to sector health, safety, and environmental counterparts. Figure 1 depicts Allied's health, safety, and environmental organization.

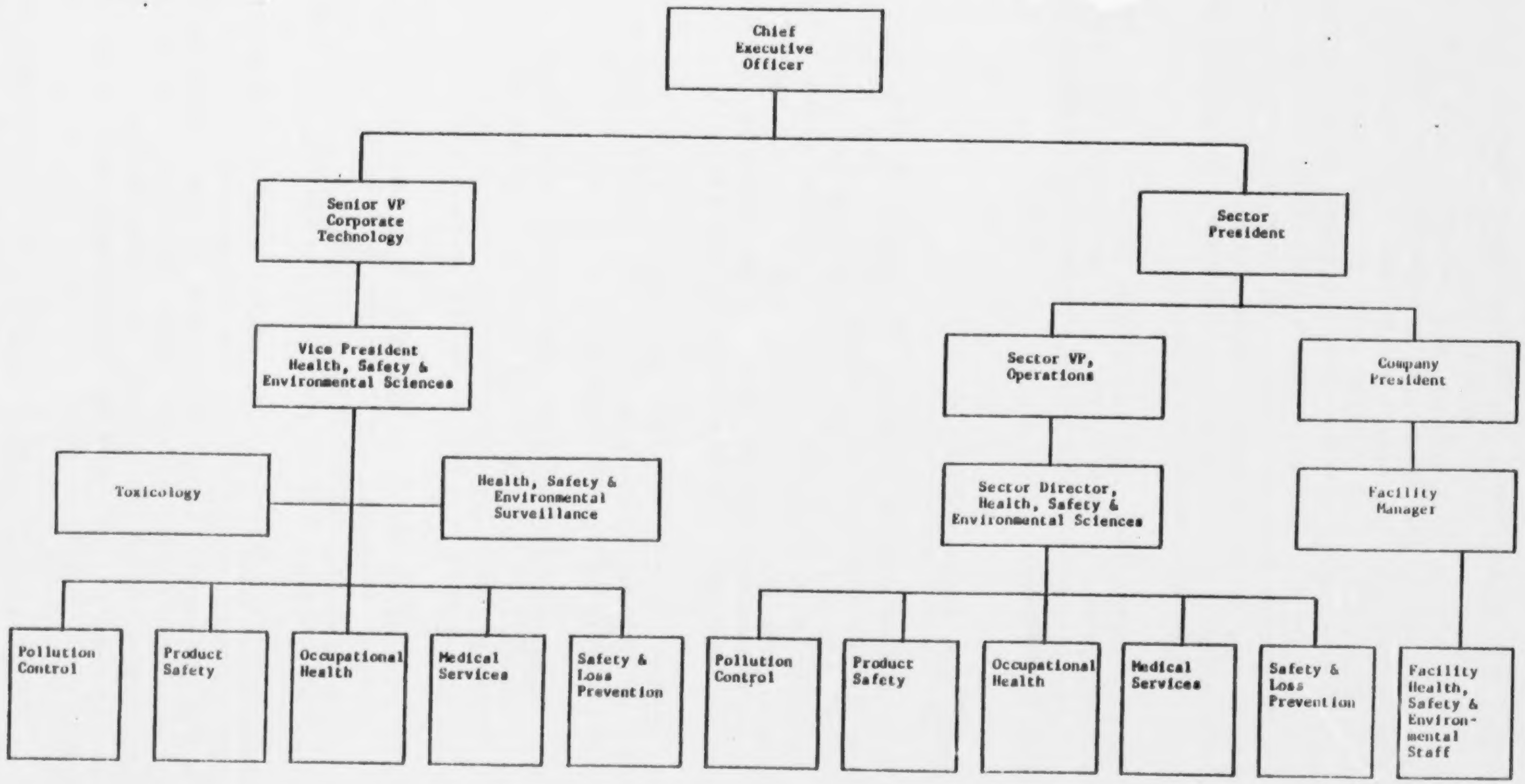
## PROGRAM PURPOSE

The objective of the Allied Corporation's Health, Safety & Environmental Surveillance Program is to provide independent verification that:

- The Corporation's operations are in compliance with the law and with corporate policies and procedures; and
- Systems are in place to insure continued compliance.

## FIGURE 1

## ALLIED CORPORATION'S HEALTH, SAFETY, AND ENVIRONMENTAL ORGANIZATION


Chief Executive Officer
Senior VP Corporate Technology
Sector President
Vice President Health, Safety & Environmental Sciences
Sector VP, Operations
Company President
Toxicology
Health, Safety & Environmental Surveillance
Sector Director, Health, Safety & Environmental Sciences
Facility Manager
Pollution Control
Product Safety
Occupational Health
Medical Services
Safety & Loss Prevention
Pollution Control
Product Safety
Occupational Health
Medical Services
Safety & Loss Prevention
Facility Health, Safety & Environ-mental Staff

Allied Corporation has a formal corporate health, safety & environmental policy, issued by the Chairman and Chief Executive Officer. The policy states that the corporation will establish and maintain programs to assure that applicable laws and regulations are known and obeyed, and will adopt its own standards where laws and regulations may not be adequately protective and where laws do not exist. There are also written corporate guidelines for each discipline (e.g., pollution control, safety, and health). For example, a Guidelines Manual has been prepared by Corporate Health, Safety, and Environmental Sciences Department and issued to all operating managers and facilities. This manual details the guidelines and practices necessary to comply with environmental regulations and corporate policies.

Sectors, companies, and individual facilities have developed their own written operating procedures to supplement the corporate guidelines. These procedures address environmental concerns specific to the individual businesses.

## ORGANIZATION AND STAFFING

Allied's Surveillance Program is housed in the Corporate Health, Safety & Environmental Affairs Department. The terms "surveillance" or "review" are used by Allied in preference to "audit" to avoid possible confusion with financial audits. Financial auditing has had rules, regulations, and generally accepted standards of practice in place for years; environmental surveillance is an evolving discipline and, as such, rules, systems, and standards do not yet exist.

A number of criteria were established when Allied considered an approach to organizing and staffing the Health, Safety and Environmental Surveillance Program including:

- Independence of the audit teams from those responsible for managing corporate and sector environmental programs--yet organizationally located where communication and resolution of problems and conflicts would be most efficient.
- Minimizing the full-time manpower commitment to the Surveillance Program--yet having a readily available supply of competent, objective team members, continuity in the conduct of reviews, and long-term accountability for the program.

With those criteria, several options were considered (such as using external auditors; establishing an independent internal group housed within the Corporate Audit Department or the Corporate Health, Safety & Environmental Sciences Department; or using task forces made up of persons drawn from throughout the corporation). Each option was viewed by Allied as having advantages and disadvantages. For example:

- An external auditor would not require the addition of any full-time employees, and would have a high degree of independence--yet would involve relatively higher total costs. Additionally, there could be substantial barriers to coordination and communication.

- An independent group within the Corporate Audit Department would have a high degree of independence from health, safety, and environmental program management--but would not have the needed perspective.

- A separate, independent group of full-time auditors within the Corporate Health, Safety & Environmental Department would afford a good opportunity for communication with health, safety, and environmental management--but their independence might be questioned.

- A task force would have broad participation and high flexibility in terms of level of effort and relatively low cost--but carry a potential for loss of continuity and disruption of regular functions.

In order to achieve the best mix of the qualities in the options above, a composite approach was adopted. The Health, Safety & Environmental Surveillance Program was established within the Corporate Health, Safety & Environmental Sciences Department and is staffed by three full-time professionals. To ensure continuity and accountability, the team leader for each audit is one of the three full-time surveillance professionals. The remainder of the audit team (which varies from three to six people depending on the review scope and size of facility) is comprised of corporate and sector health, safety, and environmental professionals familiar with the review subject but not directly involved in the programs being reviewed; and an outside consultant (which provides the advantages of an external auditor).

An audit typically takes three to four days. The current yearly budget for the program is $460,000.

The Director, Health, Safety & Environmental Surveillance, along with the outside consultant, routinely report to the Board of Directors two to four times a year on the status of the Surveillance Program.

## AUDIT SCOPE AND FOCUS

All of Allied's United States and Canadian manufacturing facilities are within the scope of the Surveillance Program--with operations assessed as having lower health, safety, and environmental risk receiving less attention than those assessed as high-risk operations. The functional scope of the program includes:

- Air Pollution Control
- Water Pollution Control and Spill Prevention
- Drinking Water Supply
- Solid and Hazardous Waste Disposal
- Occupational Health
- Medical Programs
- Safety and Loss Prevention
- Product Safety

The compliance scope includes all federal, state (or provincial), [illegible] regulations; corporate policies and procedures; and good health, safety, and environmental practices."

With approximately 400 locations and eight functional scopes, a comprehensive review of all subjects at all locations would be a formidable task. Thus, most audits are limited to only one of the functional areas listed above (e.g., air pollution control only) in order to maximize the amount of in-depth review in the time available. (Occupational Health and Medical Programs audits are conducted simultaneously but with separate audit teams; Drinking Water Supply audits are typically combined with another functional area.) Thus, while the program covers a variety of topics, the scope of a specific audit is narrow.

## AUDIT TIMING AND FREQUENCY

Thirty-six audits were conducted in 1983 and 48 are planned for 1984. The Surveillance Program reviews only a relatively small sample of the Corporation's facilities each year. Review locations are chosen to represent a cross section of Allied business interests and health, safety, and environmental concerns where the potential environmental risk is high. Corporate environmental staff, the Director of Surveillance, and the external auditor annually develop a sample of facilities to be audited that includes facilities from each of the operating companies and major business areas. Facilities are selected on a random sample basis through a process that reflects their assessed environmental risk. Audits are apportioned evenly among the various functional areas.

At the beginning of each year, the audit schedule for the year is sent out to the sector presidents and corporate and sector health, safety, and environmental staff. One month prior to the review, the Director, Health, Safety & Environmental Surveillance, sends a letter to the facility manager with copies to the sector environmental staff and the appropriate corporate health, safety and environmental staff (depending on the scope of the audit).

## AUDIT METHODOLOGY

The Health, Safety & Environmental Surveillance Program's comprehensive, in-depth audit employs a number of techniques such as formal internal control questionnaires, formal audit protocols (or guides), informal interviews with facility personnel, physical observations, documentation review, and verification.

A written audit protocol, which has been prepared for each functional area of the review, reflects the objectives of the audit, facility characteristics, and time constraints. The protocol methodically guides the auditor to an understanding of the management system through the conduct of specific tests that either confirm the system is working or determine any specific deficiencies. Each auditor carefully documents the accomplishment and results of each review step in the audit protocol in his or her audit working papers.

The basic phases in Allied's audit process (illustrated in Exhibit 1) include:

Phase I: Preparation

Among the pre-audit activities conducted by the audit team leader (full-time surveillance professional) are the confirmation of review dates and organization of the audit team based on the functional scope of the review. One month in advance of the audit, the team leader notifies the facility manager, in writing, of the specific dates and review scope. One week prior to the review, the team leader telephones the facility manager to again confirm the audit. Corporate files are screened to obtain and review information on the facility and its processes (e.g., process flow diagrams, plant layout diagrams, policies and procedures, operating manuals, permits, etc). Regulations applicable to the facility are also obtained.

Phase II: On-Site Review

The on-site review commences with a meeting of the audit team, the facility manager, and appropriate facility personnel. During this meeting, the audit team leader discusses the objectives of the Surveillance Program and the review scope. This is followed by the facility personnel presenting an overview of the facility's operations--products, processes, facility organization, etc. The review team then tours the facility, with a member of the facility environmental staff, to gain a general understanding of facility characteristics.

Following the tour, the review team and appropriate facility environmental staff meet to complete the Internal Controls Questionnaire. This questionnaire, administered by the audit team leader, aids the auditors in developing an initial understanding of facility operations, processes, personnel responsibilities, and environmental management controls. (Exhibit 2 presents a portion of Allied's Water Pollution Control Internal Controls Questionnaire.)

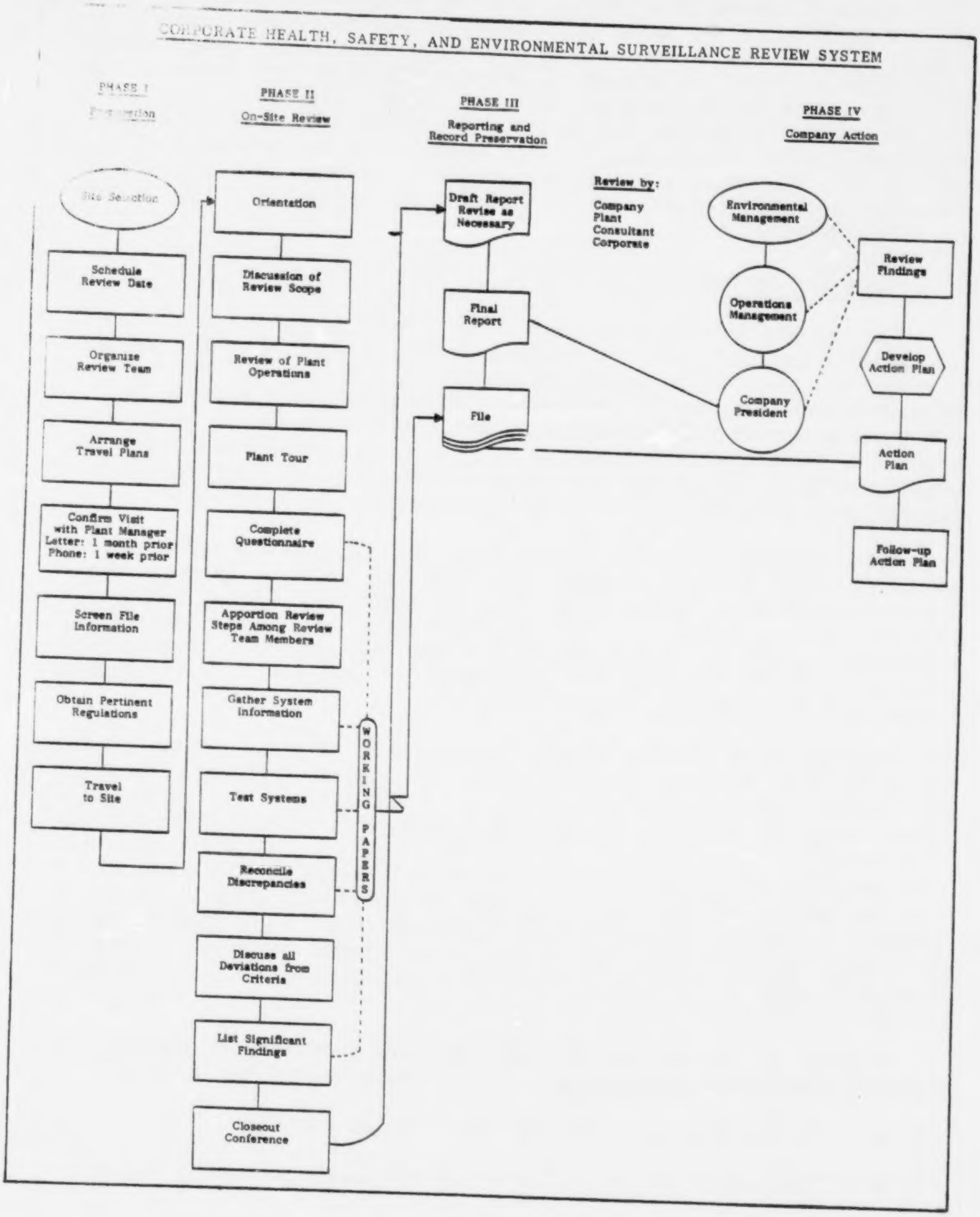
Working from the audit protocol, with major sections divided among the audit team members, each team member gathers system information and performs tests on those systems. In the course of the review, the auditor must use sampling techniques and exercise professional judgment in selecting the type and size of samples to be used to verify that the key controls in the control system under review are in place and working. No testing may be done until the system is well understood and a carefully reasoned plan of testing is worked out. Such understanding may come from interviews with facility staff, review of facility operating procedures and systems, etc. (Exhibit 3 provides a portion of a Water Pollution Control Protocol.)

Testing of the systems in place can take a variety of forms. For example, verification testing for water pollution control can include:

- Visual observation downstream from an outfall;
- Comparison of strip charts and discharge monitoring reports;

## EXHIBIT 1

## BASIC PHASES IN ALLIED'S AUDIT PROCESS


CORPORATE HEALTH, SAFETY, AND ENVIRONMENTAL SURVEILLANCE REVIEW SYSTEM
PHASE I
Preparation
Site Selection
Schedule Review Date
Organize Review Team
Arrange Travel Plans
Confirm Visit with Plant Manager Letter: 1 month prior Phone: 1 week prior
Screen File Information
Obtain Pertinent Regulations
Travel to Site
PHASE II
On-Site Review
Orientation
Discussion of Review Scope
Review of Plant Operations
Plant Tour
Complete Questionnaire
Apportion Review Steps Among Review Team Members
Gather System Information
Test Systems
Reconcile Discrepancies
Discuss all Deviations from Criteria
List Significant Findings
Closeout Conference
WORKING PAPERS
PHASE III
Reporting and Record Preservation
Draft Report Revise as Necessary
Final Report
File
Review by:
Company
Plant
Consultant
Corporate
PHASE IV
Company Action
Environmental Management
Operations Management
Company President
Review Findings
Develop Action Plan
Action Plan
Follow-up Action Plan

## EXHIBIT 2

## EXAMPLE OF A PORTION OF AN INTERNAL CONTROL QUESTIONNAIRE

### REVIEW OF INTERNAL CONTROLS
### WATER POLLUTION CONTROL
### QUESTIONNAIRE

| | | | Yes | No | N/A |
|---|---|---|---|---|---|
| 1. | Is any plant wastewater (including contaminated surface water run-off) disposed of as follows: | | | | |
| | a. | Untreated wastewater discharge to surface waters. | ___ | ___ | ___ |
| | b. | Treated wastewater discharge to surface waters. | ___ | ___ | ___ |
| | c. | Deep well injection. | ___ | ___ | ___ |
| | d. | Ocean dumping. | ___ | ___ | ___ |
| | e. | On-site disposal. | ___ | ___ | ___ |
| | f. | Discharge to POTW. | ___ | ___ | ___ |
| | g. | Disposal in a manner not covered in a-f. | ___ | ___ | ___ |
| 2. | Have applications for approval of the above plant activities been filed with the appropriate authorities in compliance with state, federal, and local requirements? | | ___ | ___ | ___ |
| 3. | Have required permits been received? | | ___ | ___ | ___ |
| 4. | Has the location complied with all the terms, conditions, requirements, and schedules of compliance of required permits? | | ___ | ___ | ___ |
| 5. | Is the location on a compliance schedule pursuant to regulatory requirements? | | | | |
| | a. | Were the interim and final requirement dates met? | ___ | ___ | ___ |
| | b. | Were required reports submitted in a timely fashion? | ___ | ___ | ___ |
| 6. | Have any of the following changes which would result in new or increased discharges of pollutants, been properly reported to the appropriate agency: | | | | |
| | a. | Facility expansion? | ___ | ___ | ___ |
| | b. | Production increase? | ___ | ___ | ___ |
| | c. | Process modifications? | ___ | ___ | ___ |
| 7. | Have the location's existing permits ever been modified, suspended, or revoked by the regulatory agency in whole or in part during its term for any cause? | | ___ | ___ | ___ |
| 8. | Has the location filed the appropriate renewal documents in a timely manner prior to expiration of all permits? | | ___ | ___ | ___ |
| 9. | a. | Are all federal, state, and local permit parameters being monitored as prescribed in the permit? | ___ | ___ | ___ |
| | b. | Is additional monitoring performed? | ___ | ___ | ___ |
| | c. | Is there a calibration and preventive maintenance program for monitoring equipment? | ___ | ___ | ___ |

## EXHIBIT 3

## EXAMPLE OF A PORTION OF A WATER POLLUTION CONTROL PROTOCOL

| Comments | W.P. Ref |
|---|---|
| | |

7.b. Permits

1. Prepare a schedule listing permit requirements currently in effect.
2. Review compliance with all permit stipulations (exclusive of effluent limitations.)
3. Review intra-company correspondence relative to permit limitation issues, note unresolved issues.
4. Prepare a schedule of compliance orders issued during the life of the permit.
5. Review compliance with the stipulations of all compliance orders.

Compliance Monitoring & Reporting

8. Based on the flowchart or narrative prepared in Step 5b, confirm you understanding of the system by performing the following:

a. System Review

Observe a complete sampling and testing process through to recording results in laboratory notebooks. Follow paper flow to applicable records, memos and reports. Note differences between plant procedures and Permit/Allied procedures.

b. Test of Transactions

1. Prepare (using independent records where available) a schedule of all excursions beyond permit limits during the review period.
2. For all excursions in above schedule determine that:
    - a. Internal notification was per your understanding of the system.
    - b. Regulatory agencies were promptly and accurately informed.
    - c. Corrective action was taken.

c. Functional Testing

1. For a representative sample of months within the review period, review the basic compliance periods noted in these records.
2. Compare the schedule with the schedule prepared in 8b.1.

- Review of programs to assure the reliability of treatment or monitoring equipment; and

- Determination that composite samplers, effluent flow measuring devices, and in-place monitoring devices are properly maintained and calibrated.

Each auditor carefully documents his or her testing plan and the results of each test. Each auditor shares his or her observations and information on deficiencies found throughout the audit. Also, time is set aside at the end of each day to exchange information on the system and share any concerns about its effectiveness. The audit team is instructed to continuously feed back any impressions being formed about the system's compliance with established criteria. This continuous feedback is intended to: eliminate misconceptions and false trails for the team member who may have misunderstood what he or she was originally told; encourage the team members to organize their thoughts; and give facility personnel an opportunity to participate in the audit process.

Significant findings are listed by each audit team member and are organized by the team leader on a summary sheet form for discussion with facility management. The on-site audit concludes with a close-out meeting between the audit team and facility management. Each receives copies of the audit findings summary form and each finding is discussed.

## Phase III: Reporting and Record Preservation

### Report Format

The purpose of the written report is to provide information to top management (sector presidents) on the more significant findings of the audit. The overall thrust of the written report is an opinion as to whether or not the facility is in substantive compliance followed by a list of exceptions noted. The report is based on findings listed on the audit findings summary form. Findings related to regulatory standards are qualified with a statement that they have not received a detailed legal review.

A standardized format for the written report has been established which consists of four parts. Section I is the who, what, where, why information. The next two sections include all significant instances of non-compliance with:

- Regulatory Standards (Federal, state/provincial, and local); and

- Allied Corporation's Policies and Procedures (corporate, sector, or facility).

The final section includes any significant deficiencies in the facility control systems which would make continued compliance with the law or company policy questionable (such as record retention, documentation, clear assignment of environmental responsibilities, etc.)

The length of the report depends on the number of findings; typically it is four to five pages long. An example of Allied's surveillance report is presented in Exhibit 4.

### Report Distribution

The written audit report is addressed to the sector president responsible for the audited facility. The report is issued in draft form (by the team leader) with copies to the involved line and staff personnel from both the operating company and corporate, the facility manager, the Law Department, and the audit team. Comments on this draft report are requested within two weeks of its issuance. When comments necessitate significant revision of the first draft, a second draft of the report may be prepared and circulated for review.

A final written report is issued to the sector president approximately one month after the review, with copies to the Legal Department, Vice President, Health, Safety & Environmental Affairs, corporate environmental functional specialists, business area management, facility manager, and the review team. The final report is accompanied with a request that the operating company respond in writing to the final report with an action plan for correcting the deficiencies noted.

### Records Retention

Allied has established a formal records retention policy which was developed to help keep the records volume at a manageable level and to ensure that all records relating to surveillance reviews are retained for a period of time consistent with their utility in the program and with applicable federal regulations. Thus, audit working papers are retained until the audit is repeated or ten years (50 years where subject to the Resource Conservation and Recovery Act (RCRA) or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) records retention requirements). Audit reports are retained for ten years (50 years where subject to RCRA or CERCLA records retention requirements).

### Other Reporting

In addition to the formal written report on each individual review to the sector president:

- The Board Corporate Responsibility Committee receives regular reports on the Surveillance Program activities two to four times a year. The Director of Surveillance attends the meetings of the Board Committee and supplements the written report with an oral report and responds to any questions the Board members may have. Also attending the Board meeting

# EXHIBIT 4

## EXAMPLE OF ALLIED'S AUDIT REPORT

ALLIED
Corporation

**Memorandum**

March 3, 1983

Mr. ___________, President
Sector ________________

SUBJECT: Environmental Surveillance Review - Hypothetical Plant

Enclosed is a report summarizing the findings of our review of Water Pollution Control & Spill Prevention programs at the Hypothetical Plant February 27 through 30, 1983.

It is suggested that the Company respond in writing to the report indicating action anticipated in response to each finding. Please provide me with a copy of the action plan.

Director, Surveillance
Corporate Health, Safety,
and Environmental Sciences

cc: VP Corporate Health, Safety & Environmental Sciences
Consultant Project Leader
Associate General Counsel
Plant Manager
Director, Environmental Affairs, Operating Division
Business Area Manager/Director
Director Corporate Pollution Control Department
Director Operating Division Pollution Control Department

---

This hypothetical report was prepared for purposes of illustration and format. Findings contained herein do not necessarily reflect actual conditions.

EXHIBIT 4 (CONTINUED)

## HYPOTHETICAL PLANT*
## OPERATING DIVISION

## WATER POLLUTION CONTROL AND SPILL PREVENTION

I. Background:

A. Purpose:

The review was performed as a part of a series of reviews conducted at selected locations in 1983 by environmental surveillance teams to provide the management of the Corporation with verification that environmental programs are conducted in compliance with Allied Corporation Policy and procedures and federal, state, and local laws.

B. Review Scope:

The review scope was limited to the conduct of the location's Water Pollution Control and Spill Prevention programs during the period January 1, 1982 through February 30, 1983.

C. Conduct of the Review:

The review was conducted on February 27 through 30, 1983 by a team composed of ____________ and ____________, Corporate Health, Safety and Environmental Sciences, and ____________, ____________, Inc. The team leader was ____________. ____________, Operating Division Water Pollution Control Manager was present during the review.

D. Report Scope:

The purpose of this report is to communicate all deficiencies noted in the course of the review which in our opinion may have substantial significance to management. Other less significant deficiencies have been discussed with plant and company representatives. All deficiencies are documented in the review working papers and have been discussed with ____________, Plant Manager.

Findings related to regulatory standards are based on our understanding of the standards and their application to the Hypothetical Plant during the review period. They have not received a detailed legal review.

---

*This hypothetical report was prepared for purposes of illustration and format. Findings contained herein do not necessarily reflect actual conditions.

## EXHIBIT 4 (CONTINUED)

Hypothetical Plant* - Operating Division
Water Pollution Control and Spill Prevention

II. Verification - Regulatory Standards

A. Findings:

On the basis of our review, we believe that the Water Pollution Control and Spill Prevention programs at the location comply with federal, state, and local regulations except as follows:

b. Exceptions:

1. Administrative procedures for spill prevention have not been fully implemented as follows:

    a. Oil storage tanks are not subject to periodic integrity testing.

    b. The Quench Oil storage tank loading valve is not locked when in non-operating status.

    c. The plant practice of opening the Hazardous Waste Storage Area drain valve during precipitation events results in unsupervised drainage.

2. In our tour of the North plant, we noted five stormwater discharge points along the east fenceline. A determination has not been made as to whether they met the statuatory definition of "point source discharges."

III. Verification - Allied Corporation Policy & Procedures

A. Findings:

With the exception of findings noted in Section II and the following, the review did not reveal any significant departure from the provisions of Corporate Policy or Corporate, Company, or Plant procedures.

B. Exceptions:

Comprehensive procedures for prevention, reporting and clean-up of chemical spills have not been developed for the South Plant.

---

This hypothetical report was prepared for purposes of illustration and format. Findings contained herein do not necessarily reflect actual conditions.

Hypothetical Plant* - Operating Division
Water Pollution Control and Spill Prevention

## IV. Control System Observations:

### A. Observations:

Our review did not reveal any significant deficiencies in plant control systems which were not summarized in Sections II & III except as follows:

### B. Exceptions:

1. We found procedures for instrument calibration and recordkeeping to be informal at the West Plant waste treatment facility.
2. Monitoring activities to detect off-site transport of waters influenced by leakage from a former plating operation do not include monitoring of a storm drain on the southwest corner of the site. Results of a 1981 hydrogeological study suggest that transport, if any, would trend toward the storm drain.

Review Team Leader

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This hypothetical report was prepared for purposes of illustration and format. Findings contained herein do not necessarily reflect actual conditions.

is a representative from the Surveillance Department's outside consulting firm. The purpose of reporting to the Board is to confirm that the Surveillance Program is functioning and to provide comfort that no material deficiencies have been noted.

- Sector presidents receive an annual oral summary on all audits conducted at locations for which they are responsible.
- Environmental and line managers receive copies of the formal report on each audit and informal communication by the Director of Surveillance on specific issues.

## Phase IV: Company Action

The job of the audit team ends with the submission and management's understanding of the surveillance report. The review process, however, continues until those responsible for correcting any deficiencies noted have prepared an action plan for correcting the deficiencies.

The action plan is developed by the facility personnel and sent to the business area manager and the sector health, safety & environmental director. The latter provides a copy of the action plan to the Surveillance Director and other managers of concern. The Surveillance Director receives the action plan for information only--to confirm that the final report has been understood, that the response is consistent with the findings of the report, and that action is taken to provide results within a reasonable time. "Reasonable" is determined by the significance of the findings. (That is, a response to a violation of regulations should be timely and in accordance with regulatory requirements; actions on deviations from policies and procedures are dependent upon the severity of the finding.)

Action plans are typically received within two months of the issuance of the final written report. The plan reports on corrective actions already taken, as well as those that are planned. Operating management then assumes responsibility for follow-up and monitoring of the corrective actions.

The Corporation's environmental assurance system includes formal procedures for follow-up and corrective action on all environmental, health, and safety deficiencies. A recognition of this commitment is evidenced by the Environmental Assurance Letter which is prepared annually by the sector presidents and submitted to Allied's Chairman and Chief Executive Officer. The letter indicates the state of compliance with Allied's Health, Safety and Environmental Policy. The objective of the letter is to assure that: (1) appropriate health, safety, and environmental systems are in place and functioning; (2) these systems recognize substantial (actual or potential) deficiencies that may exist; (3) such deficiencies are reported up to the necessary level of corporate and sector managements; and (4) appropriate action plans are developed and timely corrective actions taken. The Assurance Letters are reviewed annually at a meeting of the Corporate Responsibility Committee of the Board of Directors.

## ASSURING FOR QUALITY

There are a number of ways in which Allied ensures audit quality. First, a member of the Surveillance staff participates on each audit as team leader. The team leader's role includes making sure there is good communication among the team members. This is generally done by setting aside a block of time at the end of each day of the audit for the auditors to exchange information and share concerns.

Second, Allied's audit protocols provide a structured framework which guides the auditors through a series of steps designed to understand the system under review, conduct appropriate tests to confirm that the system is working, and determine specific deficiencies.

A third quality control measure relates to the audit working papers. The credibility of the audit depends on how well each auditor documents what he/she has done and the conclusions reached. Each team member must prepare working papers which document the information gathered in completing the protocol. At the end of each audit, the team leader reviews, initials, and dates each page of the working papers. The working papers serve as support for the audit report and a way of evaluating the audit and the performance of each team member.

Finally, Allied's outside consultant provides an additional quality control check. A representative of the consulting firm participates on each review. All audit reports are reviewed by the consultant to ensure accurate and consistent audit reporting.

## PROGRAM BENEFITS AND DEVELOPMENTS

Allied's Director of Health, Safety & Environmental Surveillance sees a number of benefits throughout the corporation resulting from the Surveillance Program. Among them are the following:

- For top management and the Board of Directors, the program provides independent verification that operations are in compliance with applicable requirements of environmental law and the corporation's environmental policy.
- For environmental management, the program serves as another source of information on the status of operations, and information on both individual deficiencies and patterns of deficiencies that may occur.
- For line management, there is added incentive for much closer self-evaluation to confirm that their operations are in compliance. The program has also stimulated line management to become more familiar with the detailed implications of environmental requirements. The program has identified problems in their operations that require corrective action, or (more frequently) it has confirmed that environmental requirements were being met.

Current developments in Allied's audit program are oriented toward improving the efficiency and effectiveness of the program. For example, the technical scope of the program has been broadened to include Good Laboratory Practices; the Drinking Water Supply area has been recently added; and the Product Safety Audits have been expanded to include quality assurance issues. The audit protocols have undergone minor changes to more effectively guide the auditors in their review, and site selection approaches are being revised and modified to respond to the changing nature of the corporation.

# IV. POLAROID CORPORATION'S ENVIRONMENTAL AUDIT PROGRAM

Polaroid Corporation's Environmental Audit Program was developed in 1980 as a way to help motivate the company's divisions and facilities in fulfilling their environmental goals and responsibilities. Several years earlier Polaroid had established a safety audit program. Based on the success of the safety audit program, Polaroid's Health, Safety, and Environmental Affairs Steering Committee (composed of top corporate officers) supported the goal of establishing a similar program in the environmental area.

In 1981 written environmental audit procedures were developed and a prototype audit was conducted at a new chemical facility. The success of this first audit and the cooperation of the facility being audited led Polaroid to implement the audit program throughout the company.

Polaroid's environmental audit program is managed by the Corporate Manager of Environmental Programs and draws on many environmental professionals working throughout the company.

## BACKGROUND

Polaroid designs, manufactures, and markets a variety of photographic products. These include instant photographic cameras and films, light polarizing filters and lenses, and diversified chemical, optical, and commercial products. Polaroid's 1982 net sales totaled $1.3 billion.

Polaroid's environmental organization is depicted in Figure 1. The Corporate Health, Safety, and Environmental Affairs Department is headed by a corporate director. This director reports to an Executive Vice President. The Department has three major groups:

- Environment (air, water, solid and hazardous waste activities, and the environmental auditing function);
- Industrial Hygiene; and
- Safety (fire protection and chemical hazard activities and the safety auditing function).

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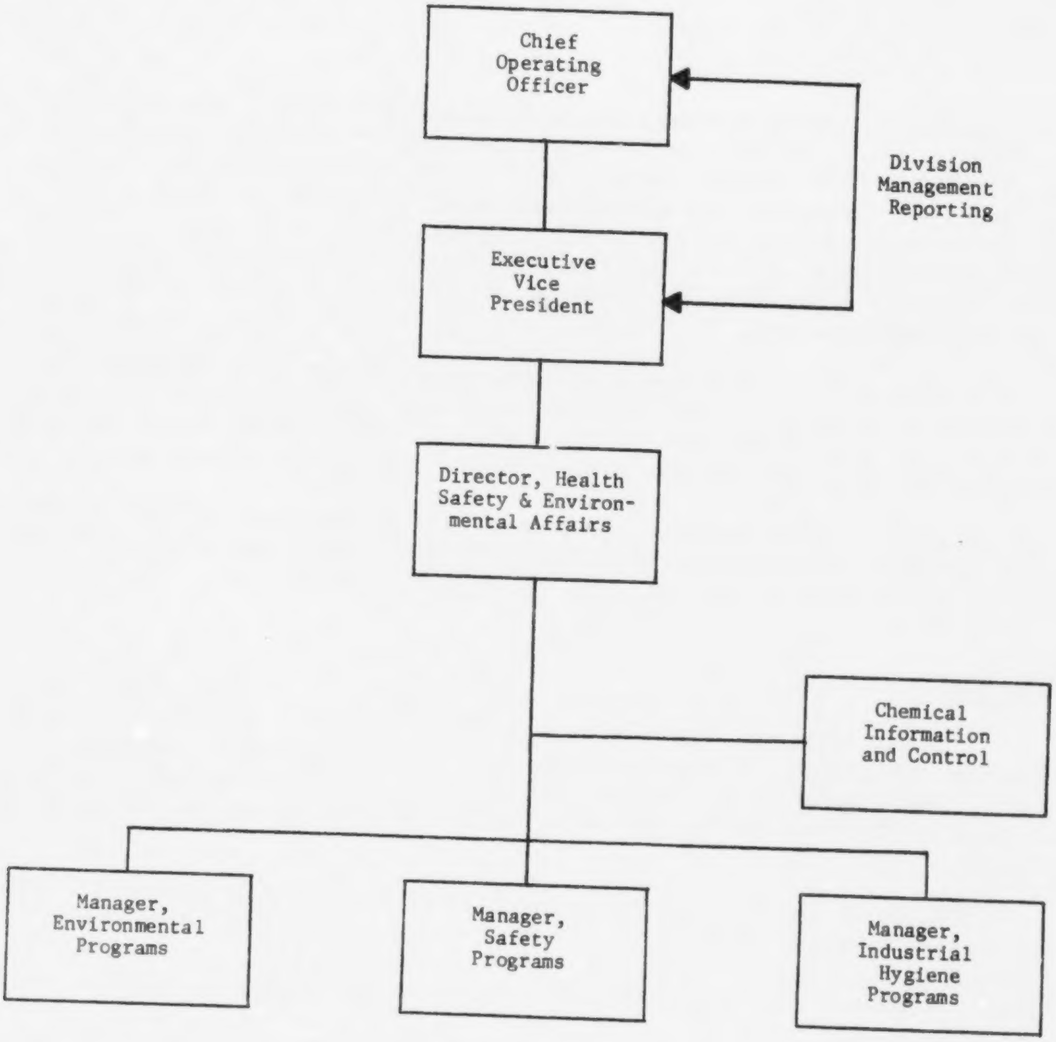
FIGURE 1

POLAROID'S ENVIRONMENTAL ORGANIZATION


Chief Operating Officer
Division Management Reporting
Executive Vice President
Director, Health Safety & Environmental Affairs
Chemical Information and Control
Manager, Environmental Programs
Manager, Safety Programs
Manager, Industrial Hygiene Programs

In addition, there are a Toxic Substances Control Act manager, an information scientist, and a consulting toxicologist, each of whom reports to the Corporate Director of Health, Safety, and Environmental Affairs. The Corporate Department acts in an oversight, consultative role to the divisions and facilities by working with all the health, safety and environmental professionals throughout the company in setting goals, reviewing performance, and implementing regulatory requirements.

Within Polaroid's 15 operating divisions, there are approximately 40 people with responsibilities for health, safety, and environmental affairs reporting to division management. Typically, one to two people within each division have such responsibility (depending on the division size and type of operation). The division environmental function is an extension of the corporate group and has day-to-day responsibility for environmental compliance.

## PROGRAM PURPOSE

The goal of Polaroid's environmental audit program is to efficiently measure and evaluate environmental performance and compliance and to help ensure that the company meets its environmental responsibilities. The audit is based on compliance with existing environmental regulations, Polaroid standards, and "good environmental practices."

The program provides:

- Information to the divisions and sites on areas of good environmental performance as well as those areas needing improvement;
- Recommendations to correct any deficiencies noted.

Polaroid has a written corporate environmental policy statement. It also has evolving environmental instructions prepared by the various environmental personnel and approved by the Corporate Manager of Environmental Programs.

## ORGANIZATION AND STAFFING

Polaroid's environmental audit program is managed by the Corporate Manager, Environmental Programs. The Audit Committee (audit team) is selected from among the environmental professionals assigned to the various divisions and sites. These professionals work either full-time on environmental, health, and/or safety issues or part-time (with a working knowledge of environmental activities).

Audit Committee members and the audit chairperson are selected by the Corporate Environmental Manager for each audit based on their area of expertise and previous knowledge of the site. They must be independent from the area to be audited; that is, the auditors cannot audit their own facility. The Committee for each audit is typically four people. Most members have degrees in chemical engineering, civil engineering, or environmental engineering. All have had training in environmental regulations.

Another key person on each audit is the audit host. This person is the environmental coordinator at either the division or the facility being audited. He or she acts as the "host" to the Audit Committee during the audit and gathers the necessary documentation and identifies the appropriate site personnel for the auditors. The host, however, is not a member of the audit team.

Polaroid's environmental audit program does not have a separate budget. Each auditor's time and expenses are paid for by his/her own division.

## AUDIT SCOPE AND FOCUS

The scope of Polaroid's corporate environmental audit program includes federal, state, and local environmental regulations, and corporate, division, and facility environmental policies and procedures. At the present time only U.S. operations that may have an impact on the environment are included. Overseas plants are included in the Corporate Safety Audit Program which also deals with some environmental issues.

All audits include the following nine sections:

- Environmental permit requirements
- Hazardous/chemical substances management
- Surface water/ground water protection
- Hazardous/chemical waste disposal
- Solid waste disposal
- Wastewater management
- Air emission management
- Material balance
- Conservation (energy, water, or other materials)

## AUDIT TIMING AND FREQUENCY

The schedule of sites to be audited is prepared by the Corporate Environmental Manager at the beginning of each year. The Chairperson (audit team leader) of each audit picks the specific dates and notifies the site, typically one month in advance of the audit, by letter.

Audit site selection is based on the potential hazards at the site and its type of operations. One audit can include only one building (which can house several divisions), or several buildings (which can be under one division). Thus, the audit program has a geographical as well as an organizational focus. Three audits were conducted in 1982 and nine in 1983.

Typical audit duration is three days. Each audit generally reviews the status of the location during the 12-24 months immediately preceding the audit.

## AUDIT METHODOLOGY

Polaroid's environmental auditors employ two primary techniques--documentation review and physical observation. Checklists are used for each of the nine audit sections and the auditors work from these checklists to perform and document the audit. Each checklist states the objectives of the audit within that particular area, lists the documentation requirements, and includes questions applicable to the particular area under review. Informal interviews are also conducted with site personnel.

The key phases in Polaroid's audit process include:

### Phase I: Audit Preparation

The Corporate Environmental Manager selects the Audit Committee and appoints the Committee Chairperson. One month prior to the audit the Corporate Environmental Manager sends a letter to the Division Manager. The letter states the purpose of the audit program, the site selected for audit, and the dates of the audit. The audit checklists are included with the letter. Working from the checklists, the audit host and site personnel gather the necessary documentation for the auditors. This documentation must be brought to the audit kick-off meeting. If the documentation is not brought, the team notes it during their audit reporting process.

Each auditor, based on his or her expertise, chooses specific sections of the audit to be responsible for (e.g., permits, solid waste disposal etc.). The Audit Chairperson ensures that all audit areas are covered.

### Phase II: Audit Kick-Off Meeting

The audit commences with a meeting between the Audit Committee and division/site personnel. During this meeting, the auditors discuss what the audit will entail, answer any questions site personnel may have, and are provided with site documents and records. Such records normally include:

- Permits
- Site inspection procedures
- Inventory of hazardous/toxic substances

- Material Safety Data Sheets
- Site hydrological map
- Contingency and Spill Prevention Control and Countermeasure plans
- Hazardous waste shipping program records and procedures
- Information on hazardous waste vendor inspection
- Process flow diagrams
- Wastewater sampling and analysis data
- Site plan with air emission sources and pollution control equipment identified
- Smoke density recorder charts for all applicable boilers
- Stack/vent testing data and results of air sampling programs

Phase III: On-Site Audit

The auditors review the documents listed above focusing on the accuracy, appropriateness, and timeliness of each. Following this documentation review, the auditors tour the site--inspecting roof tops for visible emissions, soil around the site for evidence of spills, solvent traps, etc. The auditors work from the audit checklists while gathering data; the checklists form the documentation of the audit.

As an example of Polaroid's audit process for the hazardous/chemical substances area, the auditors follow the checklist (see Exhibit 1) and perform the following tasks:

1. Review the documentation requirements such as the Chemical Inventory for the site and the Safety Data Sheets for each substance. This review focuses on the accuracy and completeness of each document.

2. Complete each item in the checklist (Section II of Exhibit 1) by:

    a. Reviewing the documentation for special handling procedures for the substances at the plant, and interviewing plant personnel regarding such procedures.

    b. Interviewing the plant material control personnel to determine what inventory controls are in place. The auditors follow this interview with a tour of the plant warehouse to determine whether the policies and procedures to control inventory are followed.

    c. Interviewing plant personnel to determine whether they are informed of the hazards and know of the safety procedures for the substances in the plant's chemical inventory.

    d. Touring the plant and observing raw materials containers to determine whether they are adequately labeled.

# EXHIBIT 1

## HAZARDOUS/CHEMICAL SUBSTANCES AUDIT CHECKLIST

-4-

### 2.0 HAZARDOUS/CHEMICAL SUBSTANCES

Objectives: To determine what hazardous/chemical substances are being used, and if special procedures are necessary for their handling and use, including inventory controls.

I. DOCUMENTATION REQUIREMENTS

A. LIST ALL IMPORTANT HAZARDOUS/TOXIC SUBSTANCES USED IN THIS BUILDING(S) SITE.

B. INCLUDE SAFETY DATA SHEET FOR EACH SUBSTANCE.

II. CHECKLIST.

A. DO SPECIAL PROCEDURES EXIST FOR HANDLING ALL THE ABOVE SUBSTANCES?

B. ARE INVENTORY CONTROLS ADEQUATE?

C. ARE ALL PLANT EMPLOYEES INFORMED CONCERNING THESE SUBSTANCES?

D. ARE ALL RAW MATERIALS CONTAINERS ACCURATELY LABELED?

## EXHIBIT 1 (continued)

E. ARE WASTE DISPOSAL PROCEDURES FOLLOWED?

________________________________________

________________________________________

________________________________________

(See Hazardous Waste Disposal, Sec. 4.0)

F. ARE APPROPRIATE INDIVIDUALS AWARE OF SPECIAL SPILL PROCEDURES?

________________________________________

________________________________________

________________________________________

G. DO THESE SUBSTANCES DISCHARGE TO THE:

| | | |
|---|---|---|
| Air | ________ | (See Air Emissions Sec. 7.0) |
| Waste Water | ________ | (See Wastewater Emis. Sec. 6.0) |
| Surface Water | ________ | (See Surface Water, Sec. 3.0) |

H. ARE MEASURES IN EFFECT TO PREVENT RUBBISH/TRASH CONTAMINATION?

________________________________________

________________________________________

________________________________________

(See Solid Waste Disposal, Sec. 5.0)

________________________________________

________________________________________

________________________________________

e. Determining whether waste disposal procedures are followed. First the auditors obtain the plant's disposal procedure. Then through physical observation and discussions with plant personnel, they determine whether those procedures are followed.

f. Determining whether the appropriate individuals are aware of special spill procedures by reviewing the plant's Spill Prevention Control and Countermeasure (SPCC) plan and interviewing the appropriate plant personnel about their knowledge of the plan and any special procedures contained therein.

g. Determining whether there are any uncontrolled discharges from the plant, by observing roof tops and touring the plant's perimeter to look at sewers and sumps.

h. Determining whether measures are in effect to prevent rubbish/trash contamination. This is done by reviewing local procedures and practices, looking in dumpsters, and talking to appropriate plant personnel.

During each of the above steps, the auditors work from the checklists to record their notes and observations.

### Phase IV: Audit Close-Out

At the conclusion of the on-site audit, the Audit Committee holds a one- to two-hour close-out meeting with division/site personnel and orally report on the findings of the audit.

## ASSURING AUDIT QUALITY

Polaroid has a number of ways to ensure consistency and quality from audit to audit. For example, all audits are conducted by experienced environmental professionals who are selected by the Corporate Environmental Manager for each audit. Additionally, the Corporate Environmental Manager reviews each audit report and participates in both the audit scoring and final audit meeting (discussed below) to ensure consistency in the reporting and scoring aspects of the audit. Finally, the Corporate Environmental Manager conducts training sessions for Polaroid's environmental professionals to help keep them thoroughly familiar and abreast of environmental regulations.

## AUDIT REPORTING

Polaroid prepares a written report of each audit. The purpose of Polaroid's audit report is to highlight those environmental activities at the plant that need improvement. Any unique or very good environmental practices are also noted. Recommendations are given for each deficiency identified whenever possible.

## Reporting Process

### 1. Preparation

Once back in his or her own office, each auditor takes the checklists from which information has been gathered and writes the sections of the report for which he/she is responsible. The Audit Chairperson collects each section and consolidates them into a draft audit report within four to eight weeks of the audit. This draft is then circulated to the Audit Committee, the Corporate Environmental Manager, and the audit host for review and comment. Comments on the draft report are submitted to the Audit Chairperson who then prepares and issues the final report to the Audit Committee, Corporate Environmental Manager, division manager, and other key operating groups. An example of a section of Polaroid's audit report is given in Exhibit 2.

### 2. Audit Scoring

Each audit is given a score, based on the score of each section of the audit report. The scoring system is used to give the divisions a quantitative idea of how well they did on the audit. In addition, it gives the audit team experience in quantifying environmental performance and forces them to make judgments about the seriousness/importance of problems identified. (Such a system is also in effect for Polaroid's safety audits.)

The Chairperson gives a preliminary score to each of the nine audit sections. Each audit section is given a possible weighting (a percentage) that relates to its importance. For example, sections on surface water/ground water protection, hazardous/chemical waste disposal, wastewater management, and air emission management are given more weight (say, 14% each) than solid waste disposal and material balance (say, 6-7% each). The total possible score for all nine sections of the report must add up to 100%. Then, each auditor's observations are listed for each section; each observation is given a maximum of 5 or 10 points depending on its significance. This is done for each section of the report. Finally a composite score is calculated by determining a percentage for each section, multiplying by the weighting figure assigned to that section, and totalling the scores for each section.

### 3. Scoring Meeting

A Scoring Meeting is held between the Audit Chairperson, Corporate Environmental Manager and the audit host. The purpose of this meeting is to announce the preliminary audit score and to determine a final score. The Corporate Environmental Manager reviews the scoring to ensure it is consistent with other audit scores. The audit host is present to be informed of his facility's score.

## EXHIBIT 2

## SECTION OF ENVIRONMENTAL AUDIT REPORT

### SECTION 1: PERMITS

Objectives: To determine which permits and licenses are necessary and required; for current site operations to determine which permits and licenses have been obtained and their locations, and which ones are missing; to determine which registrations and other reports are required to be either submitted to an Agency or maintained on site.

Findings: 1.1 With respect to the State Department of Public Safety - Division of Fire Prevention, five required documents were available and properly posted, while one was missing. The ones available were:

(Annual certificates of registration)

(1) 300,000 gal. aboveground - Class A flammables - ref. 7/16/79 license - one dated 6/6/80; second dated 3/11/81; requirement to file each year prior to April 30.

(2) 100,000 gal. Bunker C fuel oil - ref. 5/12/64 license - one dated 10/22/79; one dated 6/6/80; one dated 3/11/81.

(License)

(3) 300,000 gallons aboveground Class A flammables dated 7/16/79 (actual $\leq$ 2/3).

(Permits)

(4) Flammable drum storage at (bldg) - (75 drums total maximum; 20 inside maximum) part of 300,000 license - dated 12/22/80.

(5) Flammable drum storage at (bldg) - (250 drums total maximum) part of 300,000 license dated 12/22/80.

The document missing was a copy of the 1964 license for Bunker C fuel oil storage.

1.2 Also in possession were two special permits for ethanol storage totalling 32,000 gallons; this storage should be construed as part of the 300,000 gallons allowance.

---

This report was prepared for purposes of this study. The comments contained herein are for illustrative purposes only and do not reflect operating situations, actual or implied.

## EXHIBIT 2 (continued)

1.3 Missing was a copy of the letter from the State which approves the design and operation of the fossil fuel facility; and also missing were the applications and requirements of "RCRA interim status" for the site; although these documents are maintained in the Corporate Environmental Affairs Office file, the Audit Committee is of the opinion that they should also be kept somewhere on the site.

1.4 Approval letters for process air emissions (bldg), dated 6/78; (bldg), dated 9/78 were available on site.

1.5 With respect to wastewater discharges to the City of ______, the original approval letter (dated 4/78 and good for 90 days) and its 90-day extension were both available on site. They've obviously expired and Polaroid continues to discharge its sanitary and industrial wastewater as a "Tenant-at-Will" pending the successful execution of a three-party discharge contract among City #1, City #2, and Polaroid. A draft version of the contract has been submitted to Polaroid, comments were returned to the City #1 Sewer Commission, and a revised contract is anticipated.

1.6 The site was in possession of the 9/80 parking survey done on behalf of the EPA.

1.7 Required cross-connection permits were available (one dated 1/80 for the six-inch connection in meter pit; another dated 1/80 for the ten-inch connection in meter pit); although the State also inspects an additional cross-connection at (bldg), we neither have, nor are required to have, a permit for it.

1.8 No N.P.D.E.S. (National Pollutant Discharge Elimination System) permit is necessary for any operation on site, since all wastewater is discharged to the City ________ P.O.T.W., rather than to the ________ River.

1.9 The 5/78 letter from the City #2 Conservation Commission was available on site; this letter followed a review with its chairman, ____________, of our planned site activities and indicated that the Commission didn't need to be involved any further with our activities.

1.10 A formal oil spill prevention plan (SPCC Plan) is required and does exist for the site. Chemical spill control is performed via a short guidance document which does not reference relevant regulatory requirements such as Section 311 of the Clean Water Act.

1.11 In 1981, a 150-gallon oil spill occurred at the (bldg) storage tank; although it was contained within the dike area, thus avoiding any regulatory reporting, it nevertheless should have been reported internally via a Spill Report, but wasn't.

---------------------------------------

This report was prepared for purposes of this study. The comments contained herein are for illustrative purposes only and do not reflect operating situations, actual or implied.

### 4. Final Audit Meeting

Within two months of the audit, the final audit meeting is held with the Corporate Environmental Manager, division manager responsible for the location being audited, appropriate division/site personnel, and the Audit Committee. At this three- to four-hour meeting, which is run by the Audit Chairperson, each item in the audit report is discussed. The discussion focuses on: (1) what the audit team found during the audit; (2) why it was noted in the audit report (i.e., legal requirement, company policy, etc.); and (3) recommendations to correct the deficiencies noted. The audit score is also announced.

### Follow-up

At this time, formal audit follow-up procedures have yet to be established. It is anticipated that a six-month status report, addressing each deficiency noted in the audit report will be prepared by the Audit Host and submitted to the Corporate Environmental Manager.

### Records Retention

Although Polaroid does not have a formal records retention policy, the audit reports are retained both in areas audited and in the Corporate Environmental Office. Additionally, each auditor keeps his/her own files on each audit. These files include the checklists and any notes taken during the audit.

## PROGRAM BENEFITS AND DEVELOPMENTS

Polaroid's Corporate Environmental Manager sees the environmental audit program as benefiting the company's environmental staff both by helping them understand what the divisions/plants are doing in the environmental area and by training them on specific environmental activities. The program is also seen as a training vehicle for plant personnel--regarding regulatory requirements, corporate policies and procedures, and activities at other plants.

Polaroid has three other environmental auditing programs in place. These programs are less formal and have a more specific focus than the environmental auditing program.

- DOT Compliance Audits--at least two times a year, a Packaging Engineer who specializes in Department of Transportation (DOT) regulations visits each Polaroid loading dock in Massachusetts. The purpose of this visit is to audit Polaroid's compliance with DOT regulations for container selection, package marking and labelling, and shipping paper documentation. These audits are not formally documented. When specific problems are identified, they are communicated via a note or telephone call to the appropriate persons.

- RCRA Manifest Compliance Audits--Polaroid maintains a Resource Conservation & Recovery Act (RCRA) Control Center which monitors all hazardous waste shipments. Part of this monitoring is to comply with the cradle-to-grave manifest controls imposed by RCRA. The remainder of this monitoring is essentially a random audit of how accurately Polaroid's generators are utilizing the manifest procedures. Items such as identification numbers, code numbers, hazard designations, and waste descriptions are reviewed. The primary method of feedback is via a telephone call to the appropriate environmental engineer.

- RCRA Facility Compliance Audits--this audit program focuses on Interim Status Requirements vis-a-vis Storage Permits and Generator Requirements. A team from Corporate Health, Safety & Environmental Affairs typically audits facilities when there is a new regulation pending, or in anticipation of state inspections.

# V. PENNSYLVANIA POWER & LIGHT COMPANY'S ENVIRONMENTAL QUALITY ASSESSMENT PROGRAM

In 1976, Pennsylvania Power & Light Company became one of the first utilities in the United States to voluntarily establish an internal environmental auditing program. The program is called the Environmental Quality Assessment Program and was initiated as a result of a 1974 operational review performed by an outside consultant. This review was made to help the company determine whether it was taking full advantage of all significant opportunities to reduce costs without degrading the quality of service provided to its customers. The review resulted in the recommendation that PP&L improve its quality control procedures. PP&L's top management followed the recommendation and initiated the assessment program. The term "assessment" was chosen for the program to distinguish it from PP&L's Nuclear Quality Assurance Program.

The authority and responsibility for implementing the Environmental Quality Assessment Program has been assigned to the Executive Vice President of Operations and delegated to the Supervisor, Environmental Auditing/Modeling. The Auditing/Modeling Section is a part of the Environmental Management Division and has a staff of five full-time auditors.

## BACKGROUND

Pennsylvania Power & Light Company's electric and steam generation operations produced sales of $1.4 billion in 1982. Major organizational components of PP&L include six operating divisions, eight power plants, thirteen strip mines, two coal loading and cleaning facilities, one heated oil pipeline, and five deep mines.

PP&L's Environmental Management Division was established in 1972 and is housed within the System Power & Engineering Department. The Division's mission is to:

- Audit compliance with PP&L's environmental policies;
- Audit the design, construction, and operation of company facilities;

- Ensure responsible company behavior in environmental matters; and

- Cooperate with regulatory bodies, industry, and the general public in an atmosphere of full disclosure of environmental matters affecting the company and the citizens in its service area.

The Division, headed by the Manager-Environmental Management, has 26 full-time employees within its three major groups:

- Licensing Section--deals with new licensing and relicensing requirements
- Planning Section--deals with new and developing environmental regulations
- Auditing/Modeling Section--responsible for the environmental auditing and modeling function.

The Manager of the Environmental Management Division reports to the Vice President-Engineering & Construction who in turn reports to the Senior Vice President-System Power & Engineering. This Senior Vice President reports to the Executive Vice President-Operations.

Each of PP&L's power plants has one full-time person whose prime responsibility is environmental matters. This person reports directly to the plant superintendent who reports to the Manager-Power Production. There is also an environmental coordinator at each division. This coordinator has part-time environmental responsibility and reports to the vice president of the division.

In addition to the staff described above, there are also people with environmental responsibilities in the Distribution Department (concerned with right-of-way activities), and the Bulk Power Department (responsible for environmental impact statements for transmission and substation siting).

## PROGRAM PURPOSE

The objectives of PP&L's Assessment Program are to:

(1) Help line managers achieve the environmental compliance objectives set by the company;

(2) Increase facility personnel's awareness of existing regulations and the compliance priorities set by the company;

(3) Provide objective information to upper management so that corporate policies and procedures can be revised as needed; and

(4) Help corporate managers understand where the operating groups are in the compliance process.

The goals of each individual audit are to help line managers achieve compliance and increase their awareness of environmental regulations.

Top management maintains support of the program through a written Statement of Authority and Responsibility, issued by the Executive Vice President-Operations. This statement, issued to all facilities and incorporated into the Environmental Quality Assessment Manual, describes the authority and responsibility for implementing the Environmental Quality Assessment Program and outlines how differences of opinion between the Auditing Section and other functional groups will be resolved.

The program and its goals are communicated throughout the company by internal publications and the Statement of Authority and Responsibility. In 1980, the program was also described in the company's Annual Report.

PP&L also has written environmental policies and an Environmental Response Manual and Environmental Compliance Guidebook detailing these policies and responsibilities. Included in the Manual are facility-level procedures to implement the corporate policies. The Manual is prepared by the Licensing Section with input from the divisions and/or power plants, is signed by the Manager-Environmental Management, and is issued to power production facilities by the Manager-Power Production. The Guidebook, prepared by the Environmental Management Division, provides general guidance on environmental requirements affecting PP&L's divisional activities.

PP&L basically has three tiers of policies and procedures:

(1) Operational Policy Statements--generic corporate policies issued by the Environmental Management Division and other corporate groups.

(2) Functional Unit Policies--policies, issued by the Environmental Management Division, which outline how to implement the operational policy statements.

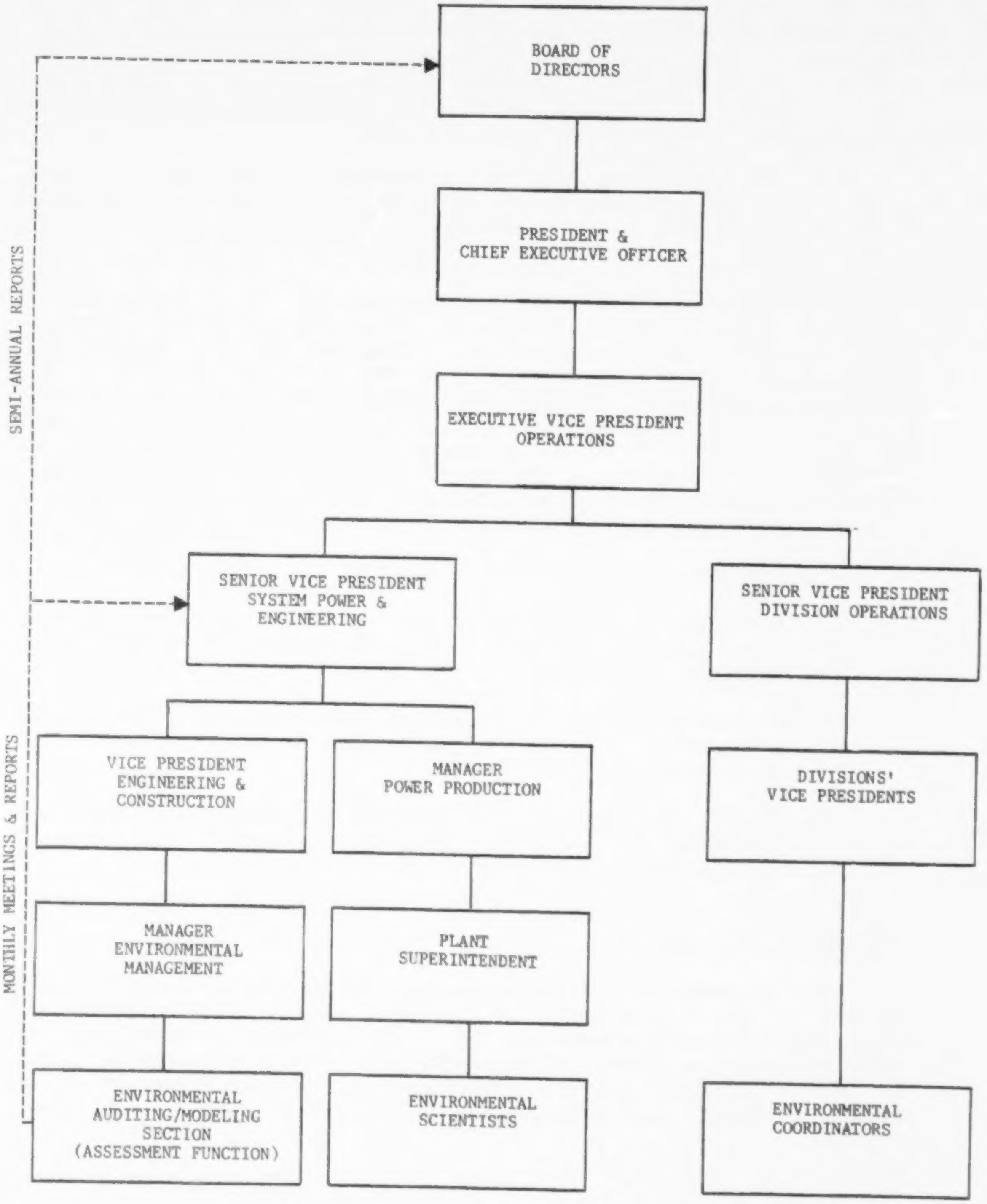
(3) Bottom Tier Procedures--"how-to" guidelines developed and issued by the plants and informally reviewed by the Licensing Group within Environmental Management.

## ORGANIZATION AND STAFFING

PP&L's Assessment Program is managed by the Auditing/Modeling Section of the Environmental Management Division. The Supervisor-Environmental Auditing/Modeling has a full-time staff of six people--one modeler and five auditors. Two of the five auditors are assigned solely to nuclear activities and the remaining three to nonnuclear activities. Figure 1 depicts the organizational relationships of the Assessment Program.

## FIGURE 1

## ORGANIZATIONAL RELATIONSHIP OF ASSESSMENT PROGRAM


BOARD OF DIRECTORS
PRESIDENT & CHIEF EXECUTIVE OFFICER
EXECUTIVE VICE PRESIDENT OPERATIONS
SENIOR VICE PRESIDENT SYSTEM POWER & ENGINEERING
SENIOR VICE PRESIDENT DIVISION OPERATIONS
VICE PRESIDENT ENGINEERING & CONSTRUCTION
MANAGER POWER PRODUCTION
DIVISIONS' VICE PRESIDENTS
MANAGER ENVIRONMENTAL MANAGEMENT
PLANT SUPERINTENDENT
ENVIRONMENTAL AUDITING/MODELING SECTION (ASSESSMENT FUNCTION)
ENVIRONMENTAL SCIENTISTS
ENVIRONMENTAL COORDINATORS
SEMI-ANNUAL REPORTS
MONTHLY MEETINGS & REPORTS

The Auditing/Modeling Section interacts with several other departments within PP&L. For example, the section performs services for the Power Production Department and Division Operations such as opacity readings, environmental noise measurements and (at the request of the facility) special audits such as Prevention of Significant Deterioration audits.

A written charter for the Assessment Program has been prepared by the Supervisor-Environmental Auditing/Modeling and incorporated into the Environmental Quality Assessment Manual. This manual includes procedures for the auditor to follow, such as a standard method for documenting and reporting deficiencies; methods to assure that all required testing and analysis procedures are identified and performed properly; procedures for corrective action to resolve deficiencies noted during an audit; and procedures for planning, performing, documenting, and evaluating audits.

The five auditors have technical backgrounds in areas such as quality assurance, chemistry, radiochemistry, biology, geology, mechanical engineering, and experience in water and wastewater treatment, ambient air and air emissions, and toxic substances. In addition, the two nuclear auditors are certified to the standards of the American National Standards Institute.

All auditors must participate in a training program that provides updates on new regulatory requirements. The program is structured so that each auditor becomes familiar with and participates in the different areas of the audit. In addition, each non-nuclear auditor attends opacity school and is recertified every six months.

The Personnel Department has prepared written job descriptions for each member of the Assessment Program. These job descriptions outline the nature and scope of the position, the reporting relationships, how the position interfaces with other parts of the organization, and the position's responsibilities.

The yearly budget for the Assessment Program is about $300,000.

## AUDIT SCOPE AND FOCUS

The scope of the Assessment Program is U.S. facilities and includes: power production facilities (coal, oil, nuclear and hydro), combustion turbines and diesel generators, PP&L's six operating divisions, strip mines, coal loading facilities, deep mines, a heated oil pipeline, and a chemical laboratory. When necessary, audits are also conducted of off-site disposal operations, as well as the activities and programs of PP&L's outside consultants. The compliance scope includes all federal, state, and local environmental regulations.

The scope of each individual audit is tailored to the specific facility. There are 26 possible audit subjects:

- Air:
  - Visible emissions EPA method 9
  - In-stack emissions monitors (calibration, documentation, etc.)
  - Ambient monitors (calibration, documentation, etc.)
  - Fugitive dust regulations
  - Asbestos regulations
  - Volatile organic compound emission regulations
- Water:
  - National Pollutant Discharge Elimination System (sample, analysis, and documentation)
  - Spill Prevention Control and Countermeasures Plan
  - National interim primary drinking water regulations
  - Erosion and sedimentation regulations
  - Dams and encroachments
  - Water quality management program (sampling, analysis and documentation)
- Solid and Hazardous Waste:
  - Hazardous waste regulations
  - PCB regulations
  - Off-site disposal, on a sample basis
  - Department of Transportation regulations governing the transportation of liquids (pipeline)
- Mining:
  - Office of Surface Mining Regulations
  - Pennsylvania Surface Mining Conservation and Reclamation Act
- Other:
  - Nuclear Regulatory Commission--low-level regulations (detectors in coal silos and pipelines)
  - Noise (levels at fence line)
  - Pennsylvania Fire Marshall regulations
  - Laboratory quality assurance/quality control procedures
  - General overall inspection of the facility
  - Review of in plant procedures
  - Compliance review of special agreements of understanding, memoranda of understanding, and consent agreements
  - Verification of corrective action on previous audit findings

The focus of each audit includes:

- Federal, state, and local environmental regulations
- Permits
- Corporate policies and procedures
- Corporate records and technical data
- Environmental control systems
- Quality assurance programs
- Codes
- Contractual and licensing requirements
- Accepted practices

Since the audit scope is tailored to each facility, the audit may include such elements as:

- For Pipeline Assessments--the audit typically includes all pollution control regulations (air, water, and solid waste), Department of Transportation, Spill Prevention Control and Countermeasures (SPCC), and Fire Marshall regulations.
- For Mining Assessments--the audit includes Office of Surface Mining regulations, State mining regulations, PCBs and hazardous wastes, NPDES, State Water Quality, SPCC, erosion and sedimentation control, and drinking water regulations.

Audits may also be performed on new sites prior to purchase.

## AUDIT TIMING AND FREQUENCY

PP&L conducts about 30 audits per year. Each facility is on a two-year audit cycle except for the nuclear facilities. (The audit cycle for the nuclear facilities is determined by their specific license requirements.) Each audit covers the period since the last assessment.

Typically, an announcement of the audit is made to the facility 30 days in advance. This notice includes instructions for preparing for the audit, the names of the auditors, and the audit scope. Two weeks prior to the audit a detailed schedule of the audit is sent to the facility. Occasionally, the Assessment Program conducts "surprise" or "impromptu" assessments, usually when there appears to be a potential problem or concern at a facility.

## AUDIT METHODOLOGY

PP&L's program is comprehensive (multi-media), independent (from the facility being audited and the person receiving the audit report), in-depth (using a multitude of auditing techniques), and documented (with working papers and reports). The basic phases of PP&L's program are described on the following pages:

Phase I: Audit Preparation

Prior to the actual on-site audit, the auditors:

- Review all Federal, state, and local environmental regulations pertaining to the audited facility;
- Review plant policies and procedures;
- Review the audit checklists for each regulation and update, as necessary, for any changes;
- Review past audit reports;
- Review financial records for new purchases of equipment; and
- Telephone the facility to discuss any new developments.

Phase II: On-Site Audit

Audits of power production facilities and operating divisions typically last three days with a team of two to three auditors. At the beginning of the audit, the audit team meets with facility personnel. At this pre-audit meeting, the detailed audit schedule is reviewed, areas to be audited are explained, and any questions the facility personnel may have are addressed. The auditors then conduct the audit, which includes such areas as:

- Taking opacity readings;
- Measuring noise levels;
- Reviewing maintenance and calibration checks of pollution control equipment;
- Assessing NPDES compliance by: observing samples being taken, observing how the analyses are performed, checking the raw data and verifying the analytical results, examining sample records, and taking split samples (which are given to an outside laboratory to verify the facility's analyses); and
- Checking the facility's PCB activities, including labeling and storage operations.

The techniques used by the team include:

- Document review (for example, a review of NPDES permits to ensure compliance).
- Evaluation (for example, of plant procedures to see whether they are appropriate to get the job done).

- Verification (for example, the span and zero drift of the in-stack monitoring instruments).
- Analyses by outside laboratories (of ponds or discharges) and verification by the team of the laboratory numbers with those of the facility.
- Investigation (for example, dye testing a drain to ensure that it is in compliance with permit and/or engineering drawings).
- Inspections (for example, of facility discharge structures).

In addition, the team employs checklists, questionnaires and informal interviews with facility personnel. Also, photographs are used to document the audit.

Exhibit 1 presents a portion of a Spill Prevention Control and Countermeasures checklist. The full checklist is five pages long and includes 23 items pertaining to SPCC plans and requirements. Similar checklists for each of the 26 audit subjects serve as guides for the auditor to assure both that the audit focuses on all the necessary areas of the particular subject and that the auditors use the correct regulatory requirements. Checklists are completed by the auditor for each audit area and serve as the basis for the audit reports.

### Phase III: Reporting Process

PP&L's reporting process begins with oral reporting of the audit's findings by the audit team during the audit exit interview with the facility management and staff. Here the audit findings are discussed and facility personnel have the opportunity to clear up any misunderstandings and to comment on the audit. Next, the audit team prepares a formal written report on each audit. The purpose of the report is to inform line and corporate management of the status of the facility's environmental compliance and to help line management attain compliance by identifying areas where the facility is not in compliance and delineating the corrective actions to be taken to achieve compliance.

Other reporting includes a written six-month report which is coordinated with the Financial Audit Department. This formal report goes to the Audit Committee of the Board of Directors and provides both comfort and knowledge of any outstanding issues to be resolved.

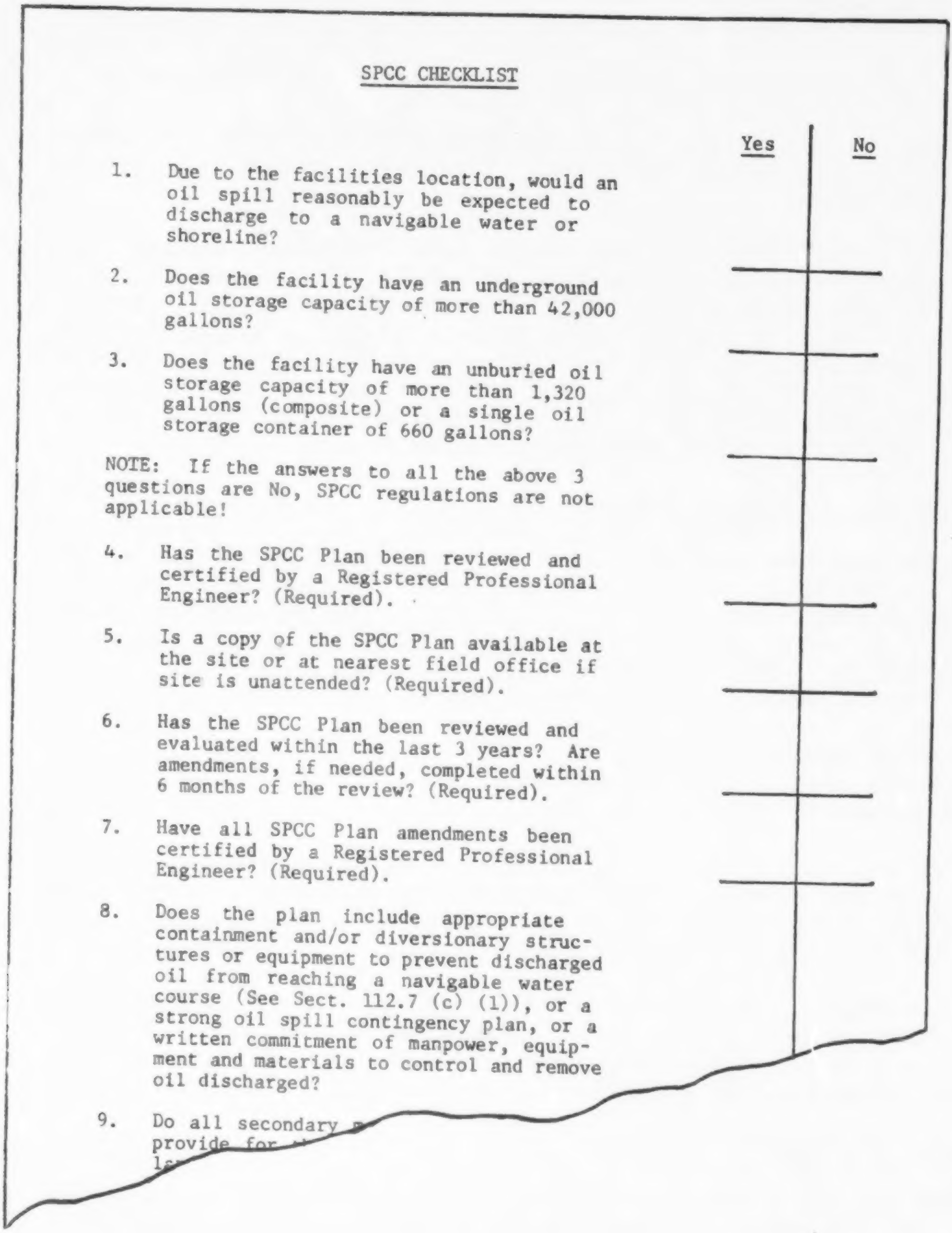
In addition, the Supervisor-Environmental Auditing/Modeling, reports monthly to the Senior Vice President-System Power & Engineering, both orally and in writing on major problems and also positive areas (exceptionally good practices) uncovered during the audits.

### Report Preparation

Audit finding sheets are prepared by the audit team prior to the audit's exit interview and are reviewed by key facility personnel. (Exhibit 2 lists instructions for the auditor to follow in preparing the

## EXHIBIT 1

## PARTIAL CHECKLIST FOR SPCC AREA



### SPCC CHECKLIST

| | Yes | No |
|---|---|---|
| 1. Due to the facilities location, would an oil spill reasonably be expected to discharge to a navigable water or shoreline? | | |
| 2. Does the facility have an underground oil storage capacity of more than 42,000 gallons? | | |
| 3. Does the facility have an unburied oil storage capacity of more than 1,320 gallons (composite) or a single oil storage container of 660 gallons? | | |
| NOTE: If the answers to all the above 3 questions are No, SPCC regulations are not applicable! | | |
| 4. Has the SPCC Plan been reviewed and certified by a Registered Professional Engineer? (Required). | | |
| 5. Is a copy of the SPCC Plan available at the site or at nearest field office if site is unattended? (Required). | | |
| 6. Has the SPCC Plan been reviewed and evaluated within the last 3 years? Are amendments, if needed, completed within 6 months of the review? (Required). | | |
| 7. Have all SPCC Plan amendments been certified by a Registered Professional Engineer? (Required). | | |
| 8. Does the plan include appropriate containment and/or diversionary structures or equipment to prevent discharged oil from reaching a navigable water course (See Sect. 112.7 (c) (1)), or a strong oil spill contingency plan, or a written commitment of manpower, equipment and materials to control and remove oil discharged? | | |
| 9. Do all secondary provide | | |

# EXHIBIT 2

## AUDIT FINDING SHEET INSTRUCTIONS

### INSTRUCTIONS FOR THE AUDIT FINDING SHEET*

| | |
|---|---|
| Items 1-4 | These items are self explanatory. |
| Item 5 | The finding number consists of the audit number followed by a hyphen and a number. The numbers shall be consecutive (i.e., the first finding in audit 84001 shall be 84001-01 the second finding 84001-02, etc.). |
| Item 6 | One of the following finding types shall be placed in this section:<br>• Significant Finding - A finding which is in conflict with federal, state, or local requirements, or Company Policy and requires that corrective measures be taken to achieve compliance.<br>• Noncompliant Finding - A finding which is in conflict with Federal, State, or Local requirements, or Company Policy, however, due to its nature cannot be corrected. An explanation of the cause of the problem and a method to prevent its recurrence may be required at the discretion of the Supervisor-Environmental Auditing/Modeling.<br>• Notable Finding - A finding which is documented, but is not in conflict with any requirements and does not require corrective action (recommendations). |
| Item 7 | The requirement to which a finding refers should be placed in this section. |
| Item 8 | The audit finding shall be described in this section. |
| Item 9 | The action which has been taken to resolve the deficiency shall be placed in this section. The cognizant manager shall sign and date this section. |
| Item 10 | The action taken to resolve the deficiency shall be verified by the auditors. If corrective action has been taken and is acceptable, this section shall be signed and dated by the Audit Team Leader or other responsible member of the audit team. |

* Items 1-7, 9 and 10 are to be completed by the Audit Team Leader. Item 8 is to be completed by the auditee and returned with the audit reply.

WKB:nas
WKB226

sheet. Exhibit 3 presents an example of a completed audit finding sheet.) These forms, along with the audit checklists, provide the basis for the final written report. Typically, a draft report is prepared within 15 days after the audit and reviewed by the audit team members. The Supervisor-Environmental Auditing/Modeling occasionally submits the draft to the Legal Department for review of the team's interpretation of environmental regulations. The Legal Department acts as a "contributor" to the audit report only in certain cases (and those cases are determined by the Supervisor). Comments are reviewed by the audit team and Supervisor and incorporated into the final report. The draft report also is submitted to the facility management for review. The Supervisor and audit team leader then hold a draft report review meeting at the facility with the key facility personnel to go over each item of the draft report. The final report is then prepared, signed by both the Supervisor and the audit team leader, and issued within 30 days of the audit.

The audit report is both a comfort statement (for example, stating that the facility meets or exceeds what is required by the regulations) and an exception list. Good practices at the facility are noted, and recommendations are given.

### Report Format

PP&L's audit report format is depicted below:

Outline of PP&L'S Audit Report

PART I: Executive Summary

PART II: Detailed Audit Report
- 1. Scope
- 2. Audit Participants
- 3. Exit Interview
- 4. Definitions:
  - a. Significant Findings
  - b. Noncompliant Findings
  - c. Notable Findings
- 5. Audit Results
  - a. Air
    - (1) Significant Findings
    - (2) Noncompliant Findings
    - (3) Notable Findings
  - b. Water*

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*Additional Sections, as appropriate, depending on the scope of the audit.

# EXHIBIT 3

## EXAMPLE OF AUDIT FINDING SHEET

AUDIT FINDING SHEET

1. Audit Team Leader ______________
2. Facility ______________
3. Audit No. ______________
4. Date ______________
5. Finding No. __________
6. Finding Type __________

7. Requirement: 40 CFR 141. "National Interim Primary Drinking Water Regulations": "141.2 Definitions...(e) 'Public water system means a system for the provision to the public of piped water for human consumption, if such system has at least fifteen service connections or regularly serves an average of at least twenty-five individuals daily at least 60 days out of the year...'

141.33 Record Maintenance. Any owner or operator of a public water system subject to the provisions of this part shall retain on its premises or at a convenient location near its premises the following records:

(a) Records of bacteriological analyses made pursuant to this part shall be kept for not less than five years. Records of chemical analyses made pursuant to this part shall be kept for not less than 10 years..."

8. Description of Finding:

Copies of the analyses performed on the ________ ground water supply are not being kept on site. The original test results are kept at the ________ Service Center.

EXAMPLE

9. Action Taken By Responsible Organization: Copies of analyses reports performed on the ________ ground water supply were forwarded to the Area Foreman, ________, Service Center, on April 15, 1981. In the future, copies of analyses reports will be forwarded on a regular basis. A complete up-to-date file will be maintained at the Service Center; however, original copies will be retained at the ________ Service Center

Cognizant Individual ______________ Date ______________

10. Closeout of Finding

Closed By ______________ Date ______________

The audit report, typically 30 pages in length, is written in two parts:

Part I: Executive Summary: One-line descriptions of the findings in each area included in the scope of the audit.

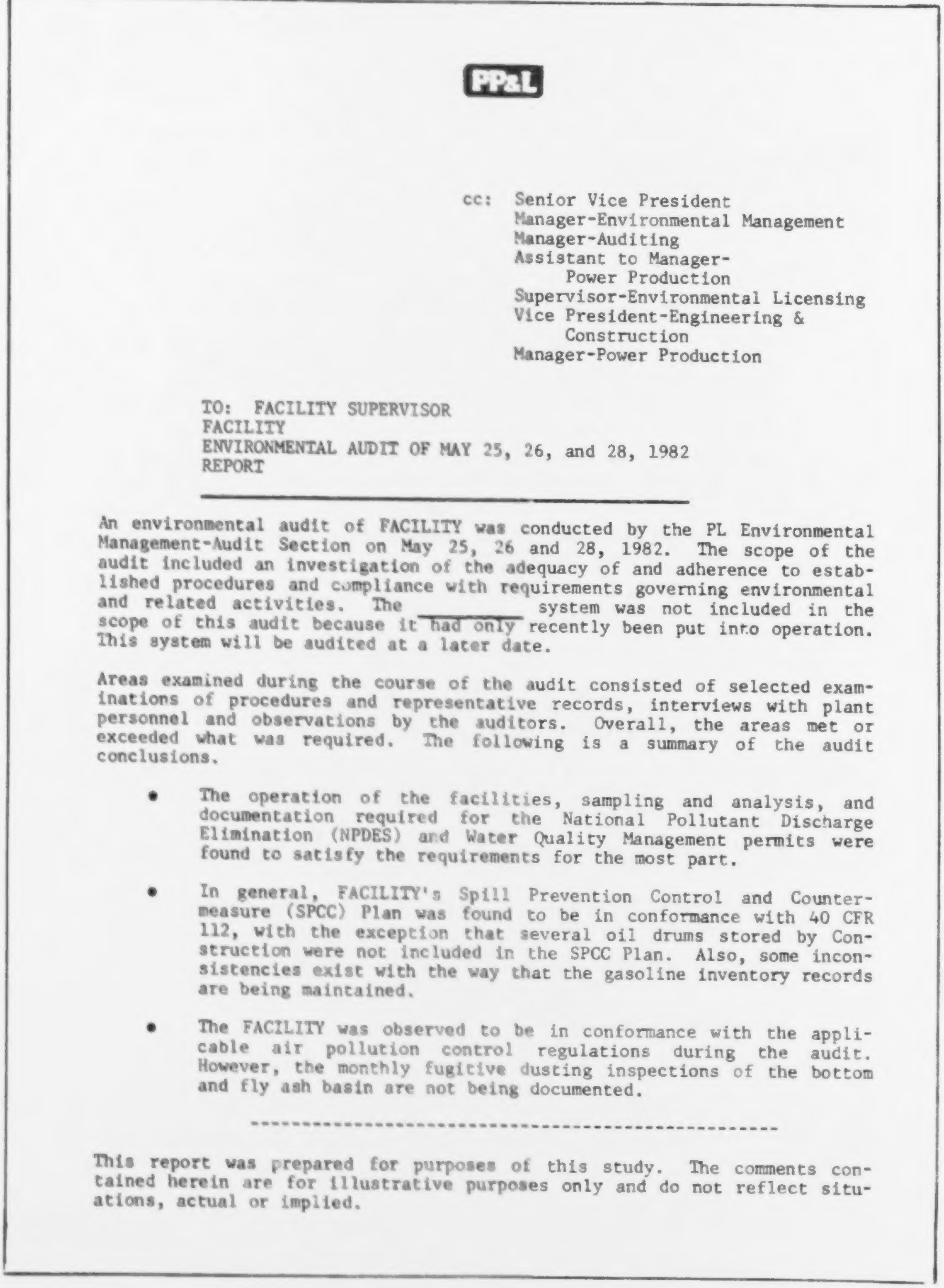
Part II: Detailed Audit Report--Listing of the Federal, state and local requirements applicable to the facility of the specific audit findings, exceptions as well as good practices. This section of the report is in five parts:

1. General: A listing of each area covered in the audit scope.
2. Audit Participants: A listing of the audit team and team leader, as well as the participants from the facility.
3. Exit Interview: A listing of the exit interview attendees, and the date of the interview.
4. Definitions: Definitions of each type of finding:
    - Significant findings: findings in conflict with Federal, state and local requirements and/or company policies which require corrective actions.
    - Noncompliant findings: findings in conflict with Federal, state and local regulations and/or company policies which, due to their nature, cannot be corrected. (For example, the NPDES permit requires four samples to be taken per month, and the facility took only three samples per month.)
    - Notable findings: findings not included above but documented here more to anticipate future problems. Examples may include management practices at the facility, storage of materials, areas identified which may be impacted by potential new regulations. Recommendations are also included here.
5. Audit Results: Each area within the scope of the audit is reported separately, such as test results, documentation, visible emission readings, pictures taken, and plant layout. This is followed by a listing of the three types of findings.

Exhibit 4 presents a portion of PP&L's audit report covering only one area of the audit's scope.

## EXHIBIT 4

## AN EXAMPLE OF PORTIONS OF PP&L'S AUDIT REPORT



**PP&L**

cc: Senior Vice President
Manager-Environmental Management
Manager-Auditing
Assistant to Manager-
Power Production
Supervisor-Environmental Licensing
Vice President-Engineering &
Construction
Manager-Power Production

TO: FACILITY SUPERVISOR
FACILITY
ENVIRONMENTAL AUDIT OF MAY 25, 26, and 28, 1982
REPORT

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An environmental audit of FACILITY was conducted by the PL Environmental Management-Audit Section on May 25, 26 and 28, 1982. The scope of the audit included an investigation of the adequacy of and adherence to established procedures and compliance with requirements governing environmental and related activities. The ________ system was not included in the scope of this audit because it had only recently been put into operation. This system will be audited at a later date.

Areas examined during the course of the audit consisted of selected examinations of procedures and representative records, interviews with plant personnel and observations by the auditors. Overall, the areas met or exceeded what was required. The following is a summary of the audit conclusions.

- The operation of the facilities, sampling and analysis, and documentation required for the National Pollutant Discharge Elimination (NPDES) and Water Quality Management permits were found to satisfy the requirements for the most part.
- In general, FACILITY's Spill Prevention Control and Countermeasure (SPCC) Plan was found to be in conformance with 40 CFR 112, with the exception that several oil drums stored by Construction were not included in the SPCC Plan. Also, some inconsistencies exist with the way that the gasoline inventory records are being maintained.
- The FACILITY was observed to be in conformance with the applicable air pollution control regulations during the audit. However, the monthly fugitive dusting inspections of the bottom and fly ash basin are not being documented.

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This report was prepared for purposes of this study. The comments contained herein are for illustrative purposes only and do not reflect situations, actual or implied.

## EXHIBIT 4 (continued)

### SECTION II

FACILITY
ENVIRONMENTAL AUDIT REPORT
PL ENVIRONMENTAL MANAGEMENT
MAY 25, 26, and 28, 1982

### I. GENERAL

The environmental audit of FACILITY consisted of the following:

A. Verification that sampling and analysis are implemented and documented, and that operational and reporting requirements are complied with as stated in FACILITY's National Pollutant Discharge Elimination System (NPDES) and Water Quality Management permits.

B. Verification of the implementation of a Spill Prevention Control and Countermeasure (SPCC) Plan, including applicable fire marshall regulations.

C. Verification that Erosion and Desimentation Control Plan Permits have been obtained where needed.

D. Verification that FACILITY meets the requirements of the Air Pollution Control Permits and FACILITY's Fugitive Dusting plan.

E. Verification of compliance with Volatile Organic Compound Emission Regulations.

F. Visible emissions tests using EPA Method 9, and a comparison of visible emissions vs. opacity monitor readings.

G. Verification that the continuous stack monitoring devices are installed, operated and documented as required by the PA Air Resources Regulations.

H. Verification that Polychlorinated Biphenyls (PCBs) are marked, stored and disposed of in accordance with 40 CFR 761.

I. Verification that asbestos is removed and disposed of in accordance with 40 CFR 61.

J. Verification that corrective measures provided for in previous audits have been or are being instituted.

K. A general inspection of the FACILITY.

L. Noise level monitoring performed at the fence line.

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EXHIBIT 4 (continued)

## II. Audit Participants

| Environmental Management | FACILITY |
|---|---|
| Audit Team Leader | FACILITY Personnel |
| Audit Team Members | |

## III. Exit Interview

An audit exit interview was held on May 28, 1982, at FACILITY. The findings of the audit were discussed among Environmental Auditing (represented by the audit team), and FACILITY (represented by FACILITY personnel).

## IV. Definitions

1. Significant Finding - A finding which is in conflict with federal, state or local requirements, or company policy and requires that corrective measures be taken to achieve compliance.
2. Noncompliant Finding - A finding which is in conflict with federal, state or local requirements, or company policy; however, due to its nature cannot be corrected. An explanation of the cause of the problem and a method to prevents its recurrence may be required at the discretion of the Supervisor-Environmental Auditing/Modeling.
3. Notable Finding - A finding which is documented, but is not in conflict with any requirements and does not require corrective action (recommendation).

## V. Audit Results

### A. NPDES and Industrial Waste Permits

FACILITY's NPDES permit expired on June 14, 1981; however, an Interim NPDES Permit application was made on December 16, 1980, which is within the required 180 day period. Monthly monitoring reports and the associated documentation for FACILITY's NPDES permit No. _____, Industrial Waste Permit No. _____ (Sewage Treatment Plant) were reviewed for the period of January, 1981 to April, 1982. The auditors are satisfied with the completeness of this data. Inspections were made of the various outfalls and the treatment basins. The sewage treatment plant was found to be operating satisfactorily and the bottom and fly ash basin dike collection system was also found to be operating properly.

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## EXHIBIT 4 (continued)

In general, the sampling and analysis methods, facility operation, documentation and reporting were found to satisfy the requirements for the NPDES and Industrial Waste permits. The auditors also collected samples from the __________ (Detention Basin) and __________ (Storm Water Basin) Discharges which were analyzed by the __________ Lab (see Attachments A and B). The results of these analyses are as follows:

| Outfall | Sample Date | Sample Type | Result (mg/l) |
|---|---|---|---|
| | 5-26-82 | Oil and Grease | < 1.0 |
| | 5-26-82 | Arsenic | 0.039 |
| | 5-26-82 | Total Iron | 0.41 |
| | 6-15-82 | PCB | < 1.0 ppb* |
| | 6-15-82 | Oil and Grease | < 1.0 |

* NOTE: This sample was analyzed by __________ Laboratories.

These sample results are all within the limits imposed by FACILITY NPDES and Industrial Waste Permits.

The following findings were noted in the NPDES and Industrial Waste areas:

1. The following are considered to be significant findings (require that corrective measures be taken):

   a. Requirement 1: 40 CFR 136.3 (a), "Environmental Protection Agency Regulations on Test Procedures for the Analysis of Pollutants," states in part:

      "(a) Every parameter of pollutant for which an effluent limitation is now specified pursuant to section 401 and 402 of the Act is named together with test descriptions and references in Table I. The discharge parameter values for which reports are required must be determined by one of the standard analytical methods cited and described in Table I,...Table I - List of Approved Test Procedures...15. Chlorine-total residual, milligrams per liter. - Iodo metric titration, amperometric or starch-iodine end-point - 1974 EPA method pg. 35 or 14th ed. standard methods pgs. 318, 322, and 329..."

      Contrary to the above requirements, ______________________________________________

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EXHIBIT 4 (continued)

2. The following are considered to be noncompliant findings (no response required):

   a. Requirement: Page 18, Section A2 "Noncompliance Notification," of NPDES permit __________ states:

      "If for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Regional Administrator and the State with the following information, in writing, within five (5) days of becoming aware of such condition:

      1. A description of the discharge and cause of noncompliance; and

      2. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge."

      Contrary to the above, noncompliance notifications are not always submitted in writing within five days. Examples include two instances of problems with the bottom and fly ash basin dike collection system which occurred on February 18, 1981, and September 4, 5, and 6, 1981. The noncompliance notifications were submitted on March 16, 1981, and November 17, 1981, respectively.

3. The following is considered a notable finding (recommendation):

   a. Not covered by regulation yet is the preparation of a PPC plan which consolidates Pollution Incident Prevention (PIP), Spill Prevention Control and Countermeasure (SPCC), Best Management Practices (BMP), and Contingency Planning. The DER has not established an absolute deadline for plan submittal, although industry is encouraged to submit before the new NPDES permits are issued. Permit applications will not be considered incomplete if not accompanied by a PPC Plan, but the new permit will most likely contain a requirement to submit a plan by a specified date if the permittee has not already done so.

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This report was prepared for purposes of this study. The comments contained herein are for illustrative purposes only and do not reflect situations, actual or implied.

### Report Distribution

Copies of the audit report are distributed to: the supervisor of the group being audited, the section head of the group being audited, the division/department head of the group being audited, the group vice president, the management of the department conducting the audit, the Offices of Corporate Administration, and the Auditing/Modeling Section.

### Report Follow-Up

A cover letter is sent along with the audit report explaining the format of the report and the procedure for replying. A response to the audit report is required from the facility manager within 30 days of the report's issuance. A written plan for preliminary corrective action is prepared by the Facility Manager with input from those responsible for each function and is submitted to the Supervisor-Environmental Auditing/Modeling. Copies of the action plan are submitted to the addressees of the audit report, and follow-up reports on the action plans are required every 60 days until the problems are corrected. The Supervisor reviews the plans for their appropriateness and timeliness, and ensures that the proposed corrective actions are being taken. In addition, if the action plan calls for the purchase of capital equipment, the Supervisor can check with the Financial and Purchasing Departments to ensure that the appropriate equipment was purchased.

As a further check on the corrective actions, on the next audit of a facility the audit team verifies, through physical observation, that the corrective actions detailed in the action plan have been taken.

If a conflict arises either because the finding was not answered or because the response was not acceptable, a phone call is made by the Supervisor-Environmental Auditing/Modeling to the appropriate facility personnel. If an agreement cannot be reached, the Supervisor can bring it to the attention of the appropriate vice presidents or department heads until the conflict is resolved. The other means for resolving conflicts is to implement the policy stated in the Statement of Authority & Responsibility in which the Executive Vice President-Operations has the ultimate decision. If there is a conflict, the Supervisor notifies the Senior Vice President-System Power & Engineering during their monthly meetings.

### Report Retention

PP&L has a formal records retention procedure. All reports, papers, and documents relating to the audit are kept in central files for a minimum of three years.

## ASSURING AUDIT QUALITY

A number of methods have been established to ensure quality and effectiveness in the Assessment Program. For example, to ensure consistency, once yearly, there is a cross over of auditors--the nuclear auditors audit the fossil activities, the fossil auditors audit the nuclear activities. In addition, the Supervisor Environmental Auditing/Modeling reviews all audit working papers, reports, and follow-up as an internal check. The Supervisor also reviews each draft audit report with the facility personnel. As a check on the Assessment Program's effectiveness, previous audit findings are reviewed as part of the next assessment at that location.

With respect to PP&L's nuclear facilities, a further check on the audit program occurs during periodic inspections by the Nuclear Regulatory Commission and yearly inspections by the Nuclear Quality Assurance Group. These two groups look at PP&L's audit reports and the corrective actions taken (in such areas as NPDES, permits, monitoring, etc.), and prepare an inspection report which goes to the Vice President, Engineering Construction Nuclear.

A final check on the Assessment Program is made through a Performance Measurement Questionnaire. This two-page questionnaire is based on the goals and objectives of the Assessment Program. It is distributed to each person who was contacted during the audit and can be returned to the Supervisor-Environmental Auditing/Modeling, anonymously, for evaluation. This evaluation forms a basis for any changes in the Assessment Program and/or the program's staff.

## PROGRAM BENEFITS AND DEVELOPMENTS

The Supervisor of PP&L's program sees many benefits derived as a result of this program, including:

- Top management gains comfort in knowing where PP&L stands regarding environmental compliance;
- Legal Counsel has seen a decrease in legal proceedings;
- Environmental Management sees the program as reinforcing the awareness of environmental responsibilities throughout the company, as well as the corporate commitment to environmental matters;
- The Environmental Response Manual has been developed with a number of policies and procedures delineating how to manage environmental compliance;
- PP&L personnel are now trained in environmental matters and have been delegated environmental responsibilities;
- Facility personnel view the assessment program as a management tool to help them manage their facility; and
- The audit is a planning tool which indicates areas where the company's procedures or policies can be improved.

Another benefit resulting from the program is providing the corporation with information about compliance so that PP&L can responsibly inform the public and regulatory agencies. This has enabled PP&L to maintain favorable relations with both the general public and the regulators. Although it has never been quantified, PP&L has seen a considerable decrease in environmental fines and citations despite the fact that regulatory agency inspections at their facilities have increased.

The Assessment Program has undergone several changes since its inception in 1976. For example, initially the audit cycle was every year (now it is a two-year cycle) and only power production facilities were involved. Also, the audit report was widely distributed initially--going to people who really had no need to receive it. The report distribution is now more tailored to the managers responsible for the audited activities.

PP&L's program is continually evolving because of changes in regulations and the increase in knowledge gained from audit to audit. A potential change in the future might be to send out the checklists to the facility prior to the audit. This would serve a dual purpose: first, the facility can do its own self-audit during the off-year when no audit is scheduled, and thus use the checklists as its own management tool; and, second, the checklists, when sent to the facility 30 days prior to the audit, would help the facility prepare for the audit, thus making the audit more efficient.

PP&L's audit program--and program personnel--have numerous external linkages. For instance, the program has been a topic at many conferences. This has caused the program to be widely acknowledged throughout industry, has attracted people to the company, and helps to professionally develop the audit staff who are speakers at those conferences. PP&L is also active within the Edison Electric Institute and the Supervisor Environmental Auditing/Modeling is the Chairman of EEI's Environmental Auditing Educational Task Force. PP&L is also very active with ad hoc groups looking at the trends and developments of environmental auditing and many informal networks developed with other companies.

PP&L's program also has many innovative characteristics. One example is the Performance Measurement Program, described previously. After each audit, questionnaires are sent out to the audited facilities to determine their opinion of the effectiveness of the audit and the competence and professionalism of the auditors. The results are sent to the Supervisor and tabulated yearly. These tabulations are forwarded to the Executive Vice President-Operations. The Performance Measurement Program allows PP&L to change the audit program, if necessary, to make it more effective.

Another innovative characteristic is the Environmental Award. This award recognizes outstanding performance in adherence to environmental regulations. A matrix is developed of the 26 areas of audit scope, and each facility is given a grade point for each area. The grade is based on number of exceptions, performance, and attitude. The matrix is scored by Auditing/Modeling Section at the end of each year. An award is given each year to a plant or division that scored the highest on the matrix. The Environmental Award is communicated through staff meetings and discussed in PP&L's employee publications. The Award has increased the environmental awareness and compliance effort with both management and facility personnel.

# VI. MILLIPORE CORPORATION'S GOVERNMENT AND REGULATORY AFFAIRS AUDIT PROGRAM

Millipore Corporation's environmental audit program started in the fall of 1981 at the initiation of the Chief Executive Officer and the General Counsel. As a result of rapid corporate growth, top management wanted additional assurance that the company's eight worldwide manufacturing plants--six of which are in the United States--were complying with environmental laws and regulations.

Millipore Corporation is considerably smaller and newer than the other companies included in this study. Millipore's environmental audit program reflects the size and entrepreneurial climate of the company. It is also a somewhat newer audit program than most of the others included in this study.

Millipore's audit program is concerned with all federal, state, and local regulations (not just environmental) that impact the corporation's products and operations. The program is managed by a regulatory affairs specialist who devotes half time to the program. Staffing is provided by the Audit Program Manager and personnel from divisional/corporate staff.

## BACKGROUND

Millipore Corporation is a relatively small (1982 sales of $272 million), extremely fast-growing, high technology corporation that is involved in developing, manufacturing, and marketing of separations technologies used for the analysis and purification of fluids in high value-added applications (e.g., pharmaceuticals, electronics, etc.). During the last 10 years, the company has had an average annual percentage growth rate in sales and net income of more than 22% per year. Along with the rapid growth have come numerous organizational changes.

Millipore's Government and Regulatory Affairs Department, with a staff of three people, is responsible at the corporate level for regulatory issues related to its products, the environment, and the workplace. The Director of Government and Regulatory Affairs reports to the Senior Vice President and General Counsel, who reports to the Chief Executive Officer.

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Within each of two divisions, one person is responsible for quality assurance and regulatory affairs. The Quality Assurance and Regulatory Affairs Manager reports to the division's Vice President of Operations. This organization structure is depicted in Figure 1.

## PROGRAM PURPOSE

Millipore's Government and Regulatory Affairs Audit Program has three objectives:

1. To evaluate the products, systems, and operations at various locations based on conformance with company policies and applicable laws and regulations, and to report the evaluation to corporate and division management;
2. To assist division management in identifying deficiencies which could adversely affect products, processes, and their impact on customers, employees, and the environment; and
3. To secure information that will permit the company to anticipate and prevent problems.

A statement of purpose for the audit program, written by the program's manager and approved by the Director, Government & Regulatory Affairs, is distributed to each facility at the beginning of each year and again prior to each facility audit.

As is the case with many of its other activities, Millipore does not have a written corporate environmental policy statement or written corporate environmental policies or procedures. Each facility has its own standard operating procedures, which are issued by the facility and reviewed at the division level.

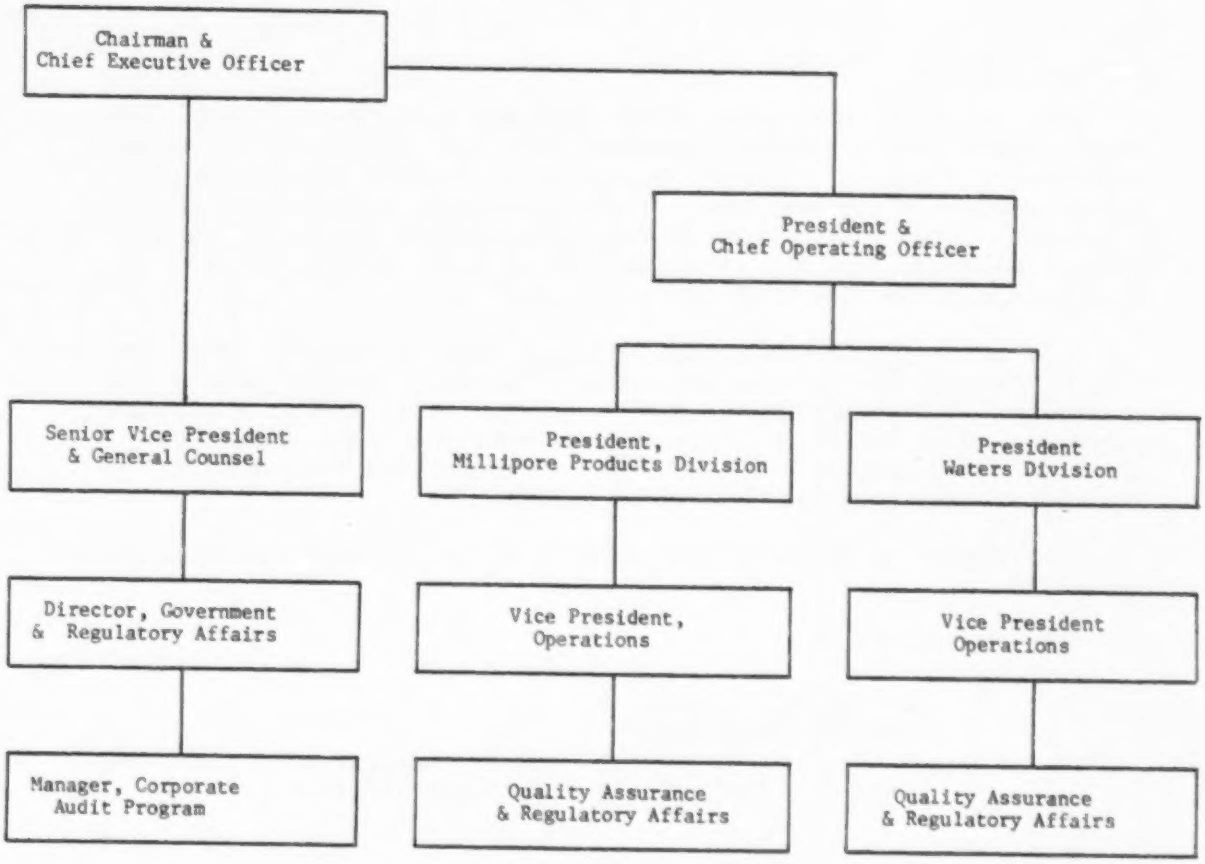
## ORGANIZATION AND STAFFING

The audit program, housed within Corporate Government and Regulatory Affairs, is managed by a government and regulatory affairs specialist who devotes half time to the audit function and reports to the Director, Government and Regulatory Affairs.

Each audit is conducted by the audit program manager and, usually, another person from the corporate or division staff with training and experience in an environmental, health, or safety discipline. Millipore's audit program attempts to make the distinction that key staff from the facility being audited are part of the audit team rather than auditees. Accordingly, the Millipore audit program also calls for a facility team of two to five people from the facility undergoing the audit. Typically, the facility's quality assurance/regulatory affairs manager, manufacturing manager, safety and environmental coordinator, and facility manager are included as members of the facility audit team.

FIGURE 1

MILLIPORE ENVIRONMENTAL ORGANIZATION STRUCTURE


Chairman & Chief Executive Officer
President & Chief Operating Officer
Senior Vice President & General Counsel
President, Millipore Products Division
President Waters Division
Director, Government & Regulatory Affairs
Vice President, Operations
Vice President Operations
Manager, Corporate Audit Program
Quality Assurance & Regulatory Affairs
Quality Assurance & Regulatory Affairs

The facility team works closely with the corporate auditor(s), responding to questions and issues as they arise during the audit.

Millipore's Audit Program Manager is active in professional societies (such as the Regulatory Affairs Professional Society) to keep abreast of environmental auditing activities and developments.

An audit can take from three to five days with one or two auditors. The program's yearly budget is approximately $30,000.

## AUDIT SCOPE AND FOCUS

The scope of Millipore's audit program includes six U.S. and Puerto Rican manufacturing facilities and the company's 12 active Regeneration Centers. (These Regeneration Centers are nonmanufacturing facilities which regenerate deionization resin cylinders as part of a service.) The audit covers all operations carried out at the facility. Off-site activities are the responsibility of each facility and are not directly included in the corporate audit program.

The scope of each individual audit includes all federal, state, and local regulations (not just environmental), permits, facility policies and procedures, environmental control systems, and quality assurance programs. The functional scope of the audit may vary depending on the facility's operations. (For example, some facilities have sterilization operations; some generate radioactive wastes.)

The functional scope of the audit program includes the following areas:

- Environmental:
  - Air pollution control
  - Water pollution control
  - Solid and hazardous waste management (including "vendor audits" of hazardous waste disposers)
- Workplace issues:
  - Organization and administration of safety program
  - Training/inspections
  - Internal controls
  - Fire protection
  - Noise
  - Handling and storage of hazardous materials
  - Machinery
  - Protective equipment
  - Exposure
  - Medical (examinations, first-aid, surveillance)

- Quality assurance:
  - QA program and systems
  - Document control
  - Label control
  - Incoming inspections
  - Recall
  - Complaint system
  - Food and Drug Administration issues
  - Calibration
- Other:
  - Facility security
  - Housekeeping
  - Sterilization
  - Regeneration
  - Radioactive material

Included in the audit is a review of the facility's vendor audit program for hazardous waste disposal. The vendor audit, performed yearly by designated facility individuals (e.g., hazardous waste coordinator, purchasing), follows a checklist prepared by Corporate Government and Regulatory Affairs. This checklist, 23 pages long, includes issues such as facility description, regulatory approval, training, safety/security, facility handling and storage procedures, spill containment, treatment procedures (incineration, landfill), and environmental monitoring. The completed checklist is returned to Government & Regulatory Affairs for review.

## AUDIT TIMING AND FREQUENCY

Millipore conducted its first four audits in the fall of 1981. Six audits were completed during 1982, and seven audits in 1983. The basic program design calls for audits of all U.S. manufacturing facilities and one Regeneration facility on a yearly basis. The Regeneration Centers are audited only after major renovations or when there is reason to believe that potential problems exist, and not on a yearly basis. A facility could be audited twice within a year if there appears to be a potential problem.

At the beginning of each year the audit schedule for the year is sent out to the two division presidents and each facility manager. One month prior to the audit, the facility manager is reminded by telephone of the upcoming audit.

## AUDIT METHODOLOGY

Millipore's audit program has documented procedures and working papers and is independent from the facility being audited and the person receiving the audit report.

The audit approach focuses primarily on two major techniques: records/documentation review--comprising 50-60% of the auditing efforts--and physical observation. An audit manual, which contains checklists for each area of the audit scope, is used by the auditors. Exhibit 1 provides a portion of an audit checklist. The full environmental checklist is 13 pages long and includes 77 items. Informal discussions are also held with facility personnel to gain a more thorough understanding of the facility's operations and procedures.

Millipore's overall auditing procedure includes the following two basic phases:

Phase I: Preparing for the Audit

Prior to each audit, the audit program manager collects and reviews pertinent information on the facility (internal memos, agency inspections, previous audits, complaints, etc.). Additional audit team member(s) may be selected from the division or corporate staff, depending on the size of the facility and complexity of its operations.

The facilities are notified of the audit schedule at the beginning of the year. At least one month prior to the audit, the facility is notified by a telephone call of the dates for the upcoming audit. Two weeks before the actual audit, there is a pre-audit meeting with facility personnel to:

- Assure that the audit team and facility personnel understand the objectives of the audit;
- Define the scope of the audit;
- Review compliance programs, operations manuals, previous internal audit reports and related corrective actions, current and proposed regulations and appropriate internal policies relating to personnel practices, quality assurance procedures, specifications, etc; and
- Discuss any issues of potential concern the facility management may have.

For facilities not within geographical proximity to corporate headquarters, this pre-audit meeting is conducted with facility management via telephone. During this meeting, the auditor discusses the audit scope with facility personnel, identifies key facility personnel to interact with during the audit, and collects needed information to prepare the audit itinerary. The audit itinerary serves as the audit plan and delineates the who, what, when, and where of the audit. Exhibit 2 illustrates a portion of an audit itinerary.

Phase II: Performing the Audit

The audit commences with an orientation meeting with key facility personnel. During this meeting, objectives of the audit are discussed, the itinerary and audit procedure are presented, and any areas of

EXHIBIT 1

## PORTIONS OF ENVIRONMENTAL AUDIT CHECKLIST

12.26 Has the facility obtained detailed chemical and/or physical analyses of representative waste samples for the streams? Internal? External? Where maintained?

12.27 Have analyses been repeated when the process has changed, or when the off-site facility indicated that the waste does not match the manifest? Has this occurred? When? What?

12.28 Is there a formalized waste analysis plan (parameters for each hazardous waste analyzed, rationale for selection, test methods for parameters, sampling methods for obtaining representative samples, and frequency of analysis)? What does it contain?

12.29 Who maintains the various forms, permits, and licenses?

12.30 How are these forms, permits, etc., monitored for possible amendments and changes?

12.31 Where are hazardous waste manifest copies maintained? How monitored? How long are they kept?

## EXHIBIT 1 (continued)

12.45 How often are personnel retrained regarding hazardous waste handling?

12.46 Are there records that document training and/or job experience? Where?

12.47 Is there a written job description for each position (including skill, education, and duties)? Where?

12.48 Is there a formalized hazardous waste inspection plan? What does it consist of?

12.49 What is the procedure for conducting a hazardous waste inspection-

12.50 How often are hazardous waste inspections conducted? Documented?

12.51 What areas are subject to inspection?

## EXHIBIT 2

## EXCERPTS FROM AN AUDIT ITINERARY

Page 3 of 5

### CORPORATE AUDIT - ITINERARY

| Date | Time | Area |
|---|---|---|
| Thursday/May 26 | 8:30 | Receiving |
| | | Warehouse |
| | 12:00 | Lunch |
| | 1:00 | Incoming Insp. |
| | 3:00 | Calibration |
| Friday/May 27 | 8:30 | Environmental Issues |
| | 12:00 | Lunch |
| | 1:00 | Environmental Issues |
| | 2:00 | Radio-Active Material |
| Monday/June 13 | 8:30 | Casting/Mix Room |
| | 12:00 | Lunch |
| | 1:00 | Casting/Mix Room |
| Wednesday/June 15 | 8:30 | Review Product Documentation |
| | 12:00 | Lunch |
| | 1:00 | Product Review Documentation |

concern or changes to the facility are identified. The meeting is followed by a facility tour to familiarize the audit team with the facility's operations. The tour is followed by another meeting with the facility audit team to go over the audit itinerary and begin the actual field work. The audit typically takes three to five days. As shown in Exhibit 2, it is not uncommon for the audit team to initiate the field work one week and to complete the audit two weeks later.

Typical audit steps include:

- An evaluation of general overall operations (a review of programs, procedures, processes, products, etc.);
- Environmental issues (records review of permits, chemical inventory, manifests, and evaluation of compliance with written procedures);
- Workplace/OSHA issues (documentation review of accident reports, OSHA inspections, and compliance tour of pertinent safety areas); and
- Good Manufacturing Practices and Quality Assurance (evaluation of labeling procedures, complaint system, in-coming inspections, calibration procedures, returned goods and recall procedures).

At the conclusion of the audit, a formal meeting is held with facility personnel to discuss the team's findings and observations.

## ASSURING AUDIT QUALITY

Audit consistency is achieved by having the audit program manager act as the team leader on all audits. A check on the program occurs with the review of the audit report by the other audit team members and by the Director, Government and Regulatory Affairs. Audit effectiveness is evaluated through the encouragement of comments and suggestions by the audited facilities directed to the Director, Government and Regulatory Affairs, and/or to the General Counsel.

## AUDIT REPORTING

Millipore's audit program manager prepares a formal written audit report one week after the audit. The report, typically about 15 pages long, includes four major sections:

1. Itinerary: Names of the corporate auditor(s) and the facility team, and areas covered during each day of the audit.

2. Summary: Two-page summary listing the highlights of the audit.

3. Notations: One-page listing of applicable facility procedures and guidelines.

4. Detailed Audit Observations: Audit findings listed by functional scope. Each finding has four parts:

   a. Specific finding

   b. Responsible individual

   c. Response/corrective action

   d. Projected completion date

Items 4(b), (c), and (d) are prepared as "blanks" in the report to be filled in by the facility manager after he receives the audit report.

The audit report is addressed to the facility manager, the facility quality assurance manager, and the facility environmental and safety coordinator. Copies of the report go to the Vice President and General Counsel, Director of Governmental and Regulatory Affairs, Division Manager, and the audit team member.

In spite of the audit program's organizational relationship with the General Counsel, no steps are currently taken to protect the audit findings under attorney-client privilege or work-product doctrine.

Excerpts of Millipore's audit report are presented in Exhibit 3.

### Follow-Up

Action plans for each audit finding are prepared by the facility manager and incorporated into the audit report (as items 4(b), (c), and (d) described above). These plans are prepared within two to four weeks of the audit, and are forwarded to the audit program manager for review.

The audit program manager follows up on significant report items via visits or telephone within one month of the report's issuance. Less significant report items receive follow-up during the next audit at that facility. Any repeat observations are noted in the subsequent audit report.

### Record Retention

All audit reports, records, and documents from the audits are kept indefinitely by the Corporate Government & Regulatory Affairs Department.

## EXHIBIT 3

## EXCERPTS FROM MILLIPORE'S AUDIT REPORT

### ENVIRONMENTAL ISSUES

4. The hazardous waste Guidebook/Manual is quite thorough, however, the copy in the solvent storage area does not contain the same revisions as the master book.

Responsible Individual(s):

Response/Corrective Action:

Projected Completion Date:

7. It is recommended that there be an individual within the hazardous waste program with a varied background (i.e., chemical knowledge, able to respond to emergencies, troubleshoot, etc.).

Responsible Individual(s):

Response/Corrective Action:

Projected Completion Date:

9. Lack of a formalized waste analysis plan (i.e., parameters for each hazardous waste analyzed, rationale for selection, test methods for parameters, sampling methods for obtaining representative samples, and frequency of analysis).

Responsible Individual(s):

Response/Corrective Action:

Projected Completion Date:

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## EXHIBIT 3 (continued)

10. It is recommended that there be an individual to possibly look at methods for the reduction or recycling of hazardous waste. The volume of waste, and cost for disposal has not changed since 1981.

Responsible Individual(s):

Response/Corrective Action:

Projected Completion Date:

11. A formalized training program regarding hazardous waste, including the overlap into the safety program, is needed. Regulations require that individuals must have classroom instruction or on-the-job training, to perform their duties properly (i.e., procedures for using, inspecting, and repairing emergency and monitoring equipment; general handling of waste; use of communication and alarm systems; procedures in response to spills, fire or explosion; procedures for shut-down of operations, etc.). In addition, individuals involved in hazardous waste management, handling, etc., must have an annual review of previous training.

Responsible Individual(s):

Response/Corrective Action:

Projected Completion Date:

12. It is recommended that the current inspection plan/check-list include key areas where waste is accumulated, and areas that may be subject to spills (i.e., labs, passivation, solvent storage, etc.).

Responsible Individual(s):

Response/Corrective Action:

Projected Completion Date:

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## EXHIBIT 3 (continued)

14. Lack of a formalized procedure (or available resources) in the event of a possible emergency situation regarding hazardous waste on-site.

Responsible Individual(s): ______

Response/Corrective Action: ______

Projected Completion Date: ______

15. Lack of a formalized procedure for notifying appropriate state and/or local authorities in the event of an emergency situation involving hazardous waste.

Responsible Individual(s): ______

Response/Corrective Action: ______

Projected Completion Date: ______

16. Previous hazardous waste vendor audit notations include information regarding the approximate number/volume and size of containers with hazardous waste; it may be worthwhile, on future audits, to review the vendor's permit which states the volume permitted on-site for various categories.

Responsible Individual(s): ______

Response/Corrective Action: ______

Projected Completion Date: ______

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## PROGRAM BENEFITS AND DEVELOPMENTS

Millipore's Audit Program Manager sees several benefits from the audit program. Top management views the program as providing them with an objective assessment of the environmental status of the facility and identifying any areas of concern. The General Counsel feels the program is part of Millipore's "checks and balances" system which provides reassurance that things are going on as appropriate. Environmental management views the program as reinforcing corporate presence and commitment to the facility while emphasizing that the corporation cares how each facility is run.

Some major changes are on the horizon for Millipore's corporate audit program. By the end of 1983, each of the two divisions is to take over a major portion of the corporate audit program--the audit focus relating to the facility's products and processes. The corporate program will then focus on auditing the environmental management systems of the two divisions.

During the fall of 1982, Millipore established a corporate occupational health and safety function. This corporate group will perform separate audits in the areas of occupational health and safety. As a result, the Corporate Government and Regulatory Affairs audit program will focus more on the capability of the facility's management systems to handle occupational health and safety activities.